VOL. XXXVIII SEPTEMBER, 1918 NO. 3

ARCHITECTVRE

The PROFESSIONAL ARCHITECTURAL MONTHLY

CONTENTS

TEXT PAGES

MODERN AMERICAN FACTORIES. (Illustrated) - Pages 231–234
By Warren R. Briggs, F. A. I. A.
FACTORY LAWS - - - - - - - - Page 234
By Frank E. Wallis, F. A. I. A.
FACTORY LIGHTING. (Illustrated) - - - Pages 235–237
By C. E. Clewell
BOOK REVIEWS - - - - - - - - Page 237
THE ARCHITECTURAL TREATMENT OF UTILITARIAN STRUCTURES. (Illustrated)
Manufacturing Building of the Pennsylvania Chocolate Company, Pittsburgh, Pa. - Page 238
THE INDUSTRIAL ARCHITECT OF TO-DAY - - Page 239
By F. E. Davidson, A. I. A.
THE WORKSHOP OF THE GRUEN WATCHMAKERS' GUILD. (Illustrated) - - - - Page 240
By G. C. Burroughs, Architect
EDITORIAL AND OTHER COMMENT: "Architecture and Art," "The Law of Supply and Demand," "Architectural League Competitions" - - Pages 241, 242
CLELAND HEIGHTS HOUSING DEVELOPMENT, WILMINGTON, DEL. - - - - - - - Page 243
By John D. Thompson, Jr., Architect
THE PERSONNEL OF THE PRODUCTION BUREAU, HOUSING DIVISION, UNITED STATES SHIPPING BOARD, EMERGENCY FLEET CORPORATION - Page 243
EXPERT SERVICE IN THE DESIGN OF A MANUFACTURING PLANT. (Illustrated)
Washburn & Heywood Chair Factory, Erving, Mass. - - - - - - - - Pages 244–247
Lee & Hewitt, Architects and Engineers
UNION PARK GARDENS, WILMINGTON, DEL. (Illustrated) - - - - - - - Pages 248–250
By William E. Groben
ELECTRIC POWER-PLANTS. (Illustrated) - - Pages 251–255
By W. Whitehill, Architect
THE EMERGENCY FLEET CORPORATION PROJECT FOR THE BAYLES SHIPYARD, INC., AT PORT JEFFERSON, L. I. (Plates) - - - - Page 255
By Alfred C. Bossom
THE RECREATION BUILDING OF THE VISCOSE COMPANY, MARCUS HOOK, PA. - - - - Page 256
Ballinger & Perrot, Architects
By William E. Groben
FIRE PREVENTION IN FACTORIES AND WAREHOUSES Page 258
By Howard Chapman
SOME OF THE BITS YOUR LIBERTY BOND WILL DO Page 258
ELECTRIC INSTALLATION FOR THE HOUSEHOLD - Pages 259, 260
By Theodore Dwight

PLATES AND ILLUSTRATIONS

GRUEN WATCHMAKERS' GUILD, CINCINNATI, OHIO
Exterior - - - - - - - - - Plate CXLII
Interiors - - - - - - - - Page 240
Plans - - - - - - - - - Page 240
G. C. Burroughs, Architect
MILLER'S FORD POWER STATION, DAYTON, OHIO
Exterior - - - - - - - - - Plate CXLIII
Interiors - - - - - - - - Plate CXLIV
West Elevation - - - - - - - Plate CXLV
Cross Section - - - - - - - Plate CXLV
Plans - - - - - - - - - Plate CXLVI
Wm. Whitehill, Architect
NAVAL SUPPLY STOREHOUSE, NEW YORK NAVY-YARD, BROOKLYN, N. Y. - - - - Plate CXLVII
Howard Chapman, Consulting Architect
UNION PACIFIC RAILWAY WAREHOUSE, OMAHA, NEB. - - - - - - - - - Plate CXLVII
Westinghouse-Church-Kerr Co., Inc., Architects
VIM BUILDING, PHILADELPHIA, PA. - - - Plate CXLVIII
Mahlon H. Dickinson, Architect
PATTERN STORAGE BUILDING, WESTINGHOUSE ELECTRIC AND MANUFACTURING CO., LESTER, PA. - - - - - - - - - Plate CXLVIII
Westinghouse-Church-Kerr Co., Inc., Architects
RUG-WEAVING FACTORY, OLSON RUG CO., CHICAGO, ILLS. - - - - - - - - Plate CXLIX
Davidson & Weiss, Architects
MODERN LAUNDRY CO. BUILDING, CHICAGO, ILLS. Plate CXLIX
Davidson & Weiss, Architects
FORD MOTOR CAR COMPANY PLANT, DETROIT, MICH. - - - - - - - - - Plate CL
Albert Kahn, Architect
SHIPWORKERS' HOMES, PORT JEFFERSON, L. I. EMERGENCY FLEET CORPORATION, U. S. SHIPPING BOARD
Group of Houses - - - - - - Plate CLI
Group of Shipworkers' Homes - - - Plate CLII
Plans of Typical Houses - - - - - Plate CLIII
Dormitory Unit - - - - - - Plate CLIV
Plan of Dormitory Unit - - - - - Plate CLV
Alfred C. Bossom, Architect
CLELAND HEIGHTS HOUSING DEVELOPMENT, WILMINGTON, DEL.
Perspective - - - - - - - - Frontispiece
Plot Plan - - - - - - - - Plate CLVI
Apartment-House Plan - - - - - Plate CLVI
Designs and Plans of Typical Houses - - Plate CLVII
John D. Thompson, Jr., Architect
SERVICE DEPARTMENT, NATIONAL LAMP WORKS, NELA PARK, CLEVELAND, OHIO - - - Page 257
Wallis and Goodwillie, Architects

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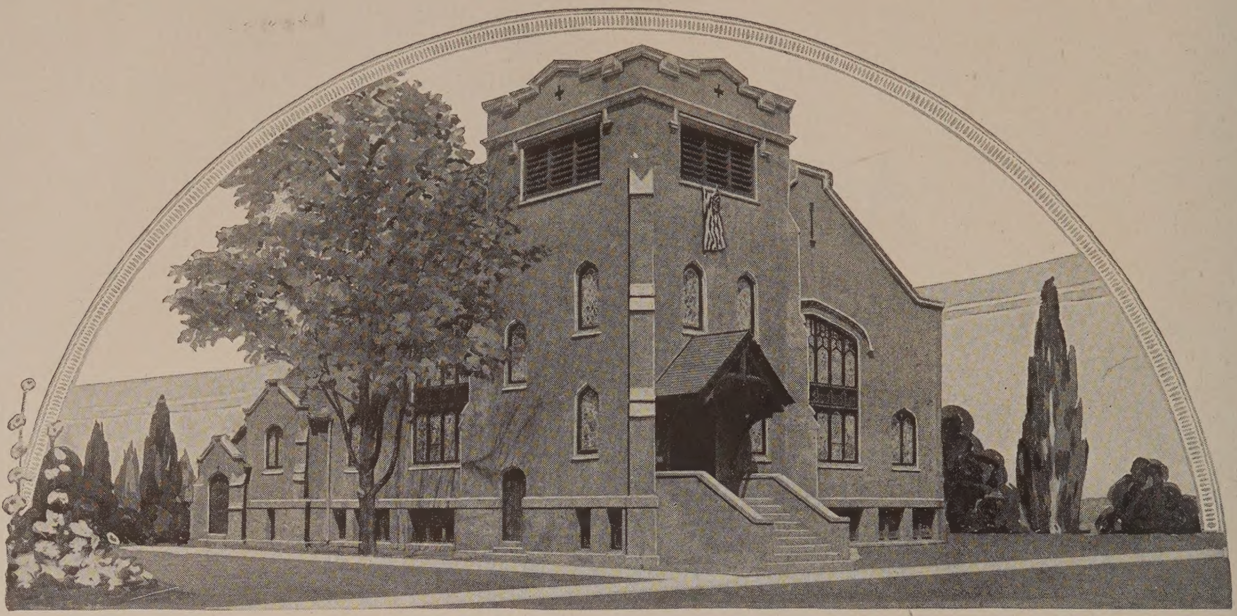

Grace Baptist Church, Binghamton, N. Y. Elfred H. Bartoo, Architect. Stucco finish on background of Bishopric Board.

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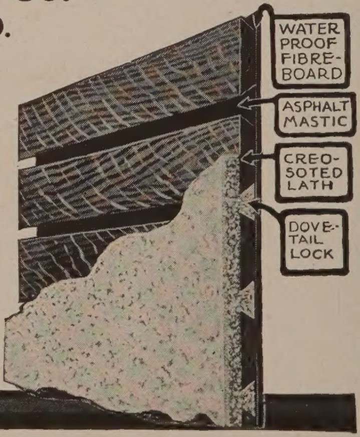

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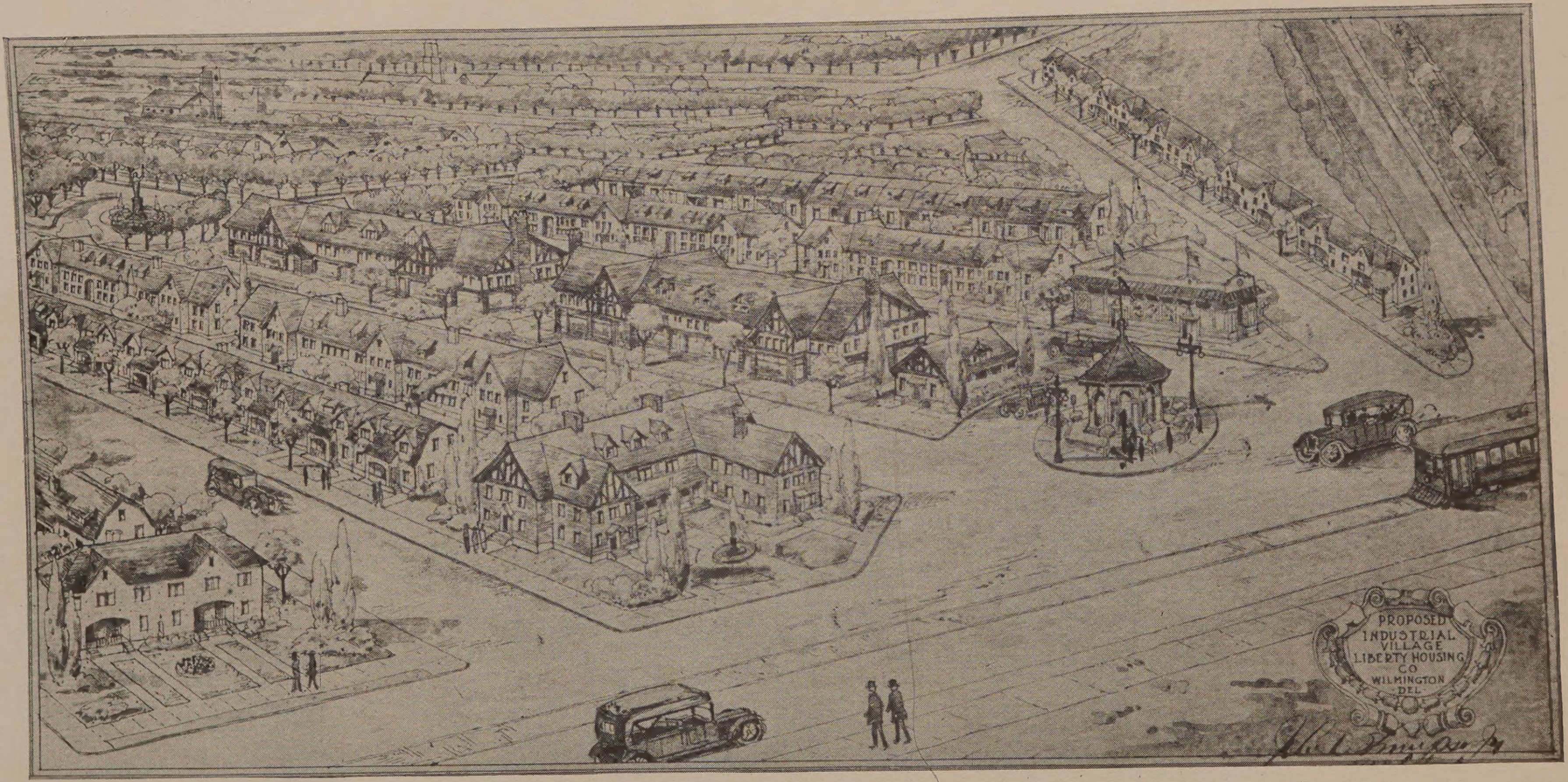

CLELAND HEIGHTS HOUSING DEVELOPMENT, WILMINGTON, DEL.

John D. Thompson, Jr., Architect.

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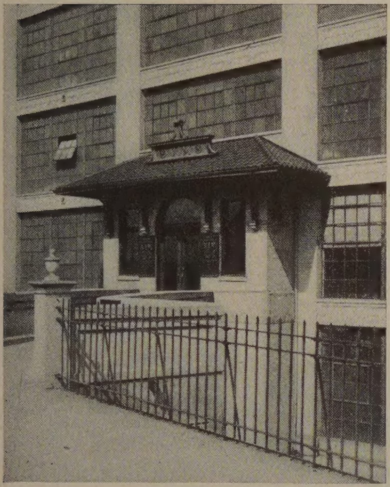
Modern American Factories

By Warren R. Briggs, F. A. I. A.



Entrance, Vim Building, Philadelphia, Pa. Mahlon H. Dickinson, Architect.

TIME was when the average American factory, to say the least, was an abominable place to work in; almost any structure that would contain the necessary machinery and keep its occupants dry was considered good enough for the purpose. All considerations of light and air were practically ignored, and as to sanitary conditions, they were simply vile. Buildings that were intolerably hot in summer and frightfully cold in winter abounded in every manufacturing community, and as a rule these structures were overcrowded, placed in unattractive localities, with environments that were a disgrace to any civilized community.

That these conditions were detrimental to those who had to endure them must be apparent—and I do not believe that any one will claim with such surroundings employees could do their best work—yet proprietors were extremely slow in recognizing these self-evident facts, for it has taken many years for them to come to a realization that well-constructed, abundantly lighted, amply heated, thoroughly ventilated, and perfectly sanitary-equipped structures are a good and paying investment.

It has, however, been proven beyond a shadow of doubt, scores, yes, hundreds of times, that a better quality of work and more of it can be and is being done in bright, sunny, well heated and ventilated rooms than in those that are dark, dingy, and smelly. Moreover, under such conditions the health and morale of the workers is vastly improved and the relations between employees and employers bettered in every way. There has gradually developed a more humane attitude by the latter toward the former, as they have come to understand that they obtain far more satisfactory results if they house their workmen in the best possible way and also contribute to their comfort and entertainment during non-working hours.

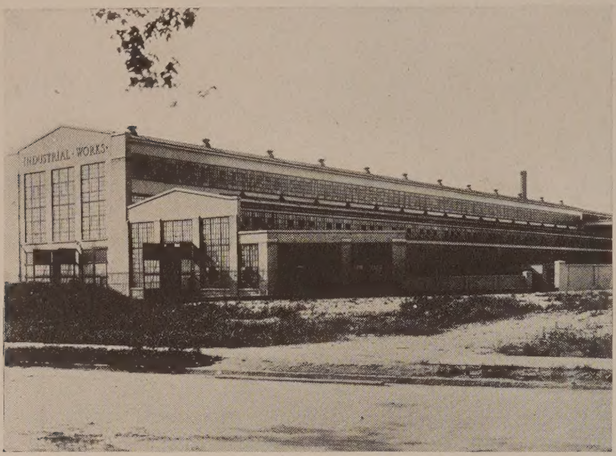
And so it has come to pass in these latter days that the modern, up-to-date factory, instead of being an unsightly shack, is, in the great majority of cases, a well-designed structure that is a pleasure to look upon and an inspiration to visit, for it will be found after a thorough inspection that the employee's life, instead of being, as in the past, a round of dirty drudgery, is really an ideal existence for those who have to work, as they spend their working hours in structures designed by skilled men and constructed in the most hygienic way known to modern science.

It is a real pleasure to go through a modern plant and study in detail the many novel and extremely interesting features that it contains. The buildings are as near fire and panic proof as it is practical to make them; broad entrances with wide staircases lead to the several floors, while emergency exits, skilfully located, open directly to fire-escapes or ramps. All parts of the buildings are equipped with automatic sprinkling systems and every kind of safety devices for the protection of the workers, but what impresses one more than anything else is the cleanliness and the abundance of light and air provided. There are no dark corners or dismal nooks, the windows and skylights being so placed that light must penetrate every portion of the rooms during the day, and the artificial lighting is so arranged that it will be equally effective at night.

The floors, ceilings, and side walls are usually of concrete or some other non-absorbent material, many times tinted in low-toned colors that are pleasing to the eye and restful to the workers. Commodious lockers and dressing-rooms are conveniently located, while the toilet-rooms are models of sanitary science. In fact, in some instances

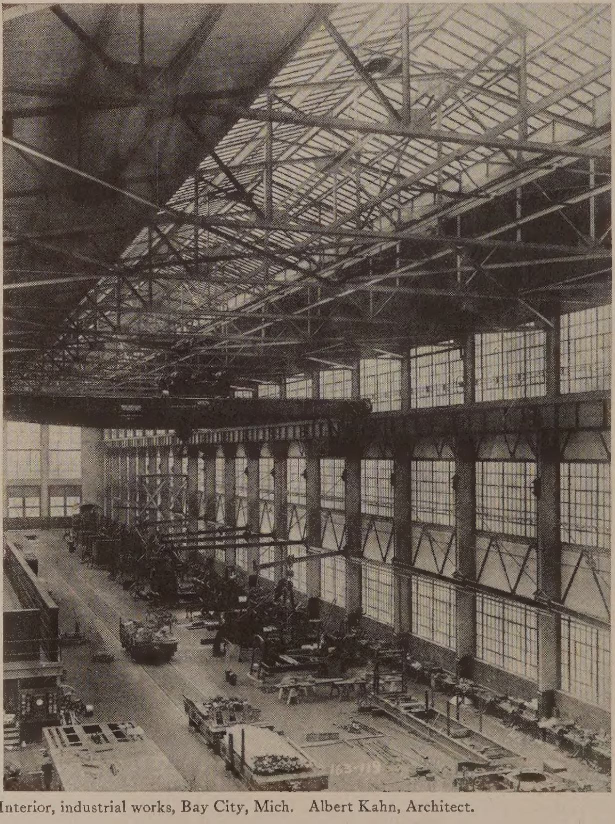
Printing building, Standard Cap and Seal Co., Chicago. Davidson & Weiss, Architects.

this portion of the building seems to have received more attention than any other. Marble, tile, or glass only is used in their construction—wood in any form being tabooed. The fixtures are the best procurable and individualism is arranged as much as possible, the old-time trough or Latrine systems being superseded by the single enclosed closet with partitions of marble or opaline glass. Individual urinals and lavatories are the rule, and in some instances shower-baths are provided. As in the large rooms, there is an abundance of light and air which is supplemented by artificial ventilation. Here again cleanliness is insisted on, as stringent rules are posted in conspicuous places which are rigidly enforced.


Industrial works, Bay City, Mich. Albert Kahn, Architect.

Lunch and recreation rooms are commodious and comfortably fitted for those who care to use them, although their use is entirely optional.

Many of the plants contain complete cuisines and pleasant restaurants where a wholesome lunch can be obtained at the actual cost price to the owners. Usually these lunches are served only to the members of the clerical forces and the heads of the various departments, although in a few instances that I am familiar with all the employees are provided for, if they wish to be so served, but here again there is nothing compulsory.


Interior, industrial works, Bay City, Mich. Albert Kahn, Architect.

Swimming-pools, gymnasiums, and roof-gardens or promenades are sometimes found, although these are not common. Every large plant maintains a fully equipped hospital with a competent physician and trained nurses in constant attendance, for where thousands are employed there are bound to be accidents even if every precaution is taken to prevent them, and first-aid promptly and skilfully administered is sometimes necessary to save a life.

As one passes through these fine structures he is naturally inclined to question the policy that has led to their construction, and to ask if so lavish an expenditure of money on buildings devoted entirely to manufacturing purposes is justified. Let me answer this by saying that it has been found that when employees work in surroundings such as described their efficiency is increased to such an extent that it more than pays for the original expenditure and the yearly cost of maintenance. These facts are being demonstrated all over the world and should be studied and heeded by all manufacturers. Truly it can be said of those who are fortunate enough to be employed in such quarters that their ways are cast in pleasant places and that their souls should be filled with content, but is this so? In the majority of cases, yes; in some instances, no; the latter being frequently shown by the marring of walls, etc., and the abuse of fixtures, which can be attributed more to ignorance and total lack of comprehension of what is being done for them than to real viciousness. That the up-to-date factory is popular with the majority is conclusively shown by the number of applicants for positions in them, and by the refusal of those who have ever worked in them to return to the old-style building.

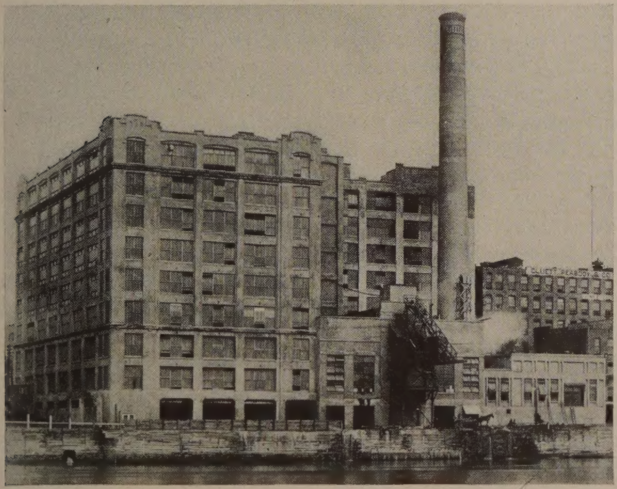
I do not wish you to get the impression from what I have written that I consider the modern factory perfect, or incapable of further improvement; far from it; but what I do assert is that it is a vast improvement on anything that we have had in the industrial line of construction up to this time. We are, if anything, a progressive people, and we are bound to advance in the future just as we have in the past, and it may be that what has been accomplished during the last few years in factory construction is but a stepping-stone to what may in the future be done in this field. There are far too many of the old factory type still in existence; these should be obliterated; there is no place in this fair land of ours for the "sweat-shop" or rookeries of any description, and no valid reason can be advanced for letting them exist. Let them be abolished in the shortest possible time, by special legislation if need be; only get rid of them and get rid of them quickly. Make the industrial housing of American workmen a model for the world—we can do it if we will—the only query, will we?

That employers have come to fully realize that the health and comfort of their employees is of paramount importance to their own success is clearly shown not only by the improved factories, but by the pains taken to produce pleasing surroundings

Biograph laboratory, New York City. Howard Chapman, Architect.

and ample facilities for healthful recreation after hours. Many of the modern plants have their grounds laid out in the most delightful manner, and one approaches them through velvety, well-kept lawns fringed with stately trees and adorned by pretty flower-beds. Fully equipped athletic-fields, tennis-courts, and swimming-pools are not uncommon in close proximity.

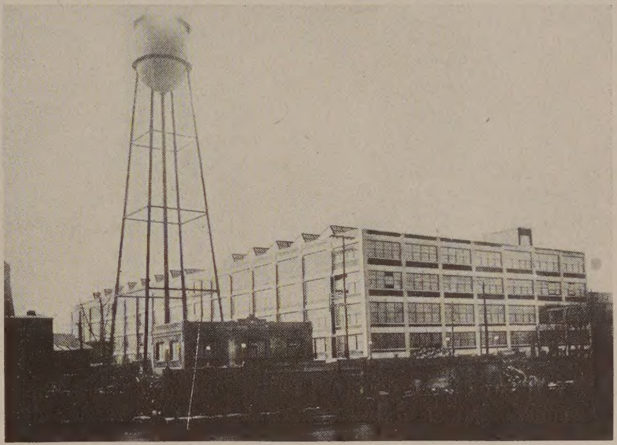
The great improvements that I have cited can be directly traced to two sources: first, to that already mentioned—the awakening of the proprietors—and second, to the employment of skilled architects to lay out the plant and to design and construct the buildings. In the old days it was no unusual thing for the owner to lay out his plant and design his buildings, or possibly he delegated this work to his superintendent-to-be or his future shop-boss; men of ability no doubt in their special lines, but totally incompetent to either lay out a great industrial plant or to design its buildings. About all these men cared for, or sought to obtain, was a required floor space covered on the sides and top, with windows enough inserted in the sides to enable them to see their way around; any comprehensive grouping of units, to obtain efficiency, was entirely beyond their vision, nor was there a thought given as to the best way to receive and distribute material, to make it into the finished product, and store and ship it without interfering with the running of the factory.



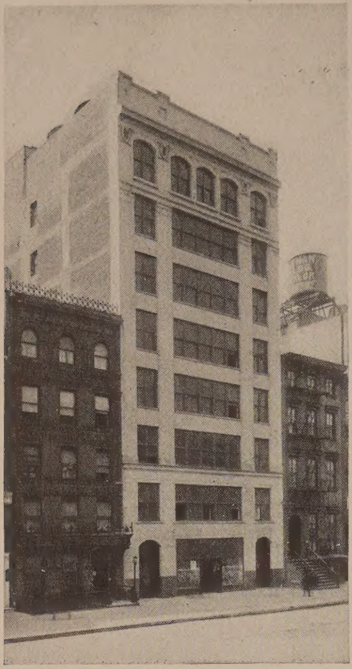
Cluett, Peabody & Co., Inc., plant, Troy, N. Y. Westinghouse-Church-Kerr Co., Inc., Architects.

Now all such problems as these are a part of the skilled designer's work, be he architect or engineer. At the outset every unit of a great plant is studied by itself, and in connection with the others, which make up the whole, so that there will be at completion a comprehensive harmony of the several units, that may be added in years to come.

In the early days of factory improvements this work was handled almost exclusively by engineers, and they still do a large amount in this line, but with results that are not always satisfactory. While their buildings may be well constructed, there is not the slightest thing about them that is pleasing to the eye. The engineer should not be blamed for this, however, for his training has not taught him architectural design. He is not a designer, but a constructor, and he has done the best he could under the circumstances, and so in the second stage of factory improvement there came into existence a class of men who styled themselves "Mill Architects"—a combination usually made up of an experienced engineer who chose to associate himself with a young architectural draftsman—for the engineer had come to realize that his buildings were lacking in those essentials that might have made them attractive architecturally; this he sought to remedy by affiliation with one who had some training in architectural design. The combination, however, to my mind was not a success, for while it may be true that for a time these firms succeeded in producing a more pleasing class of structures than the engineer when he worked alone, they were still far from satisfactory, and I cannot recall a single instance where they possessed any real architectural merit. The engineer's influence was too apparent; he still dominated the design, for while the detail was improved and the proportions better, the buildings could not be cited as good architectural compositions or the problem as satisfactorily solved. When, however, by the slow process of elimination, if I may so term it, a few of our leading manufacturers recognized the ability of the architect and, casting precedent to the winds, commissioned some of the best architectural talent of this country to lay out their plants and erect their buildings, a tremendous stride in factory construction was made. The architect had at last come into his own—and taken his place where he rightfully belongs, as designer in chief of the entire problem; not that he should eliminate the engineer, or interfere with the true scope of the latter's work, but, as I have said before, he is not a designer, but a



Mishewaka woollen mills, Mishewaka, Ind. Albert Kahn, Architect.



Daggett & Ramsdell factory, New York. Timmis & Chapman, Architects.

constructor, and he should be subordinate to the architect in his field, that of erecting buildings, in just the same way as the architect would be subordinate to him in the erection of a great bridge or an enormous dam. Each has his place and should keep to it. Has the architect, since he has been recognized, made good? Most surely; he has time and again practically demonstrated that factory buildings can be planned in the most scientific and economical way, constructed in the best manner, and made hygienically as perfect as our present knowledge permits and still retain all the elements of a good architectural composition. In fact, some of these buildings devoted entirely to manufacturing purposes are second to none in the country in architectural merit, and yet they are not ornate nor overdecorated nor has money been foolishly spent in worthless ornamentation; nothing of this kind appears, but they are well proportioned, perfectly balanced, with harmonious groupings and simple, well-studied detail; their charm lies in the perfection of these elements, their integrity and simplicity. What more can be asked? A building that looks what it is and can tell its own story in a straightforward and direct manner is always pleasing to the eye and is bound to be a good architectural composition.

Machine-shop, Pyle National Co., Chicago. Davidson & Weiss, Architects.

Many of these structures are new to-day and may for the time being appear a little crude, but when the bloom of age has settled upon them and the ravages of time softened their sharp lines, I predict that they will stand as noble monuments of the skill of the architects of our day.

Factory Laws

As a result of the constant agitation of the labor-unions, sociologists, and business-efficiency experts, there are many and diverse opinions expressed on the wisdom of some of the final conclusions in regard to factories.

The attention of architects and of the investors who manufacture floor space for the use of the numerous and growing number of factories in New York City is too frequently disturbed and distracted by the passage of building laws which affect the construction of factory buildings in New York; and the creation of new departments which pass upon the inventions, designs, and requirements of the architect and the factory manager and supervise the erection of this numerous and constantly growing number of buildings commonly called loft buildings.

It is a curious fact that while business necessities have created an efficiency department, which claims that added profits can be made through a conservation of the energies of those employed rather than through an increase in the bulk of business—as was claimed in Washington before the Interstate Commerce Commission in regard to railroad profits—this far-reaching thought has not yet been brought to the acute attention of those who wish to increase the development of the city through such organizations as the Merchants Association, who, in common with other societies throughout the country, are organized to attract new manufacturing business for various purposes. These organizations have failed to grasp the necessity of an efficiency committee to investigate the working of those who are placed by law in control of the planning and erecting of New York City buildings, the volume of which far surpasses that of any other city in the world.

In the event of such a commission interlocking directorates with a subsequent clearing-house would be suggested by the efficiency engineers for the conducting of such a gross volume of business, which at present is handled by department after department, subject to this law and to that law, and inspected and investigated by inspectors subject to the orders of chiefs who do not or cannot affiliate with chiefs appointed by law in other departments.

The consequent waste of money and of nervous energy on the part of the individual owner, of the architect and of the contractor, the extravagance of the city departments with their overlapping examiners and inspectors, all of whom are supposed to be working toward one final conclusion, each of whom is doing precisely the same thing in different offices, are causes of wonder on the part of one engaged in the planning and designing of these commercial factory buildings which add to the wealth of this city.

Through the resultant expenditure of nervous energy and money, it would seem that the effort of the men who are engaged in planning and manufacturing factory floor space is penalized by this added burden.

There can be no doubt but that New York is provincial in its approach to a subject which affects manufacturing and commerce, which should be attracted to this city for obvious geographical reasons.

Frank E. Wallis, F. A. I. A.

Factory Lighting

By C. E. Clewell

ADEQUATE and suitable illumination for factory buildings is a fundamental requirement from the standpoint of industrial management, because of a number of more or less clearly defined reasons as outlined below, and hence this feature of the building equipment is of considerable importance and interest to the architect in his preliminary and final plans for any industrial structure.

The modern factory requires, first of all, a proper structural design for providing sufficient window space. Natural lighting, as furnished to the interior work spaces, is of the utmost importance from the illumination standpoint, and it often dictates the outlines of the building, as indicated in a general way in the exterior view of the foundry shown in Fig. 1.

Satisfactory natural lighting depends only in part upon the actual proportions of window area to floor space, its success also relating to such other features as the arrangement of the side-wall and roof windows, the kind of glass used, the presence of adjacent tall buildings which may obstruct the sky from the given structure, the use of shades and awnings, the color of the interior walls and ceilings, and sometimes, also, upon the way in which the work is planned out with respect to the window spaces.

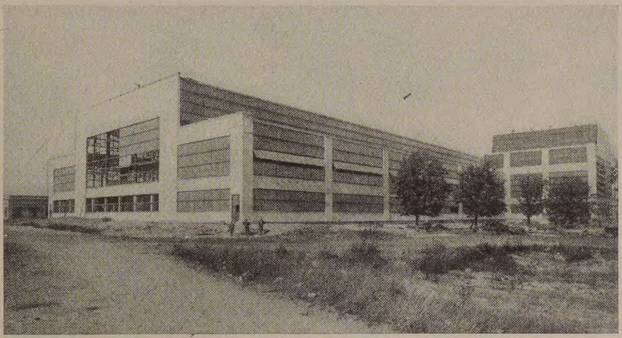


Fig. 1. A well-balanced and effective foundry-building design in which the Pond patented truss is used. Note the large area of window-sash employed.

VALUE OF GOOD LIGHTING

The interest of the architect in the successful planning of factory lighting systems is governed, in part at least, by the importance with which the building owner or manager views this feature of the physical equipment. When looked at from this point of view, the ways in which good light affect the management of any industry become of considerable interest to the architect, and they are, hence, briefly touched upon in the following paragraphs.

Up to a very few years ago the illumination facilities of the industries were looked upon indifferently. In the earlier days the types of electric lamps and gas units were not well suited to effective lighting, and this limitation of the existing equipment evidently had a good deal to do with the neglect of this item of the factory environment. Within the past ten or fifteen years great changes have been effected in the types of lamps available for industrial lighting. Not only have more efficient lamps appeared on the market, but the range of sizes has increased to such an extent that it is now possible to select a size of lamp best suited to practically every ceiling or clearance height found in modern factory and shop construction.

Hand in hand with the improvements in lamps, there has been directed toward the problems of successful factory lighting a growing attention to the value of the light both to employees and to the management, and as a result some highly interesting aspects of the problem have been developed as an aid to the appreciation of good lighting by those upon whom the responsibility rests for the selection and adoption of the lighting equipment.

SOME RELATIONS OF GOOD LIGHT TO PRODUCTION

Hence we find to-day that the outlay for a modern system of lighting is no longer looked upon by the progressive factory manager as an unavoidable expense, but that such an outlay may be interpreted into advantages which usually far outweigh the item of expense.

First, perhaps, in the order of importance, is the fact that good lighting usually has a material effect upon production in any plant. Investigations into existing factories have shown that the entire cost of a modern lighting system amounts usually to the equivalent of merely the wages for say five to ten minutes, or less, out of the entire day. On the other hand, it is possible to walk through almost any factory where no provision has been made for suitable artificial lighting, and to note the losses due to inadequate light in early morning hours, and later on in the afternoons, particularly in the winter months, which may readily amount to many times the entire cost of the light for the given day. A good lighting system tends to minimize these losses and thus may logically be looked upon as an aid to production.

Other relations of the lighting facilities in a plant to the management of the industry are such items as the greater accuracy in workmanship, which good light makes possible, the reduction of accidents, the avoidance or at least the minimizing of eye-strain, the increased cheerfulness of the physical surroundings of employees, the possibility of the performance of a given amount of work with less fatigue than otherwise, the tendency toward a more orderly shop, and the added facility with which the superintendence of the workmen may be effected. These factors are of fundamental importance to the management of any industry, and the part played by good lighting in the realization of these advantages is no longer looked upon as theoretical but as a well-defined feature requiring the attention of the designer of the factory as an important and primary consideration in his plans for the structure.

NATURAL LIGHTING

Strange as it may seem, the problems of natural lighting, as at present understood, are not nearly so well standardized nor so well worked out as those of artificial lighting. Artificial lighting has one feature which makes its solution fundamentally more simple than that of natural lighting, namely, the fact that the electric or gas lamps employed for the artificial illumination constitute sources of practical constancy, so that a system of lamps when installed, if properly operated and maintained, may be depended upon for a steady supply of illumination on the working surfaces. The sky, as the indirect source of natural light, presents, in contrast, a condition of extreme variation from the early morning to the late afternoon, so much so, in fact, that it is relatively difficult to assign to the sky definite values in the design of window areas through which this light is to be transmitted to the interior of the building. For these reasons, it is proposed in the present article to limit the discussion to some general observations on the natural lighting problem, with somewhat more specific data on the subject of artificial lighting.

Among the requirements which are commonly set forth for natural lighting the following may be mentioned: (*a*) the light from the windows should be such as to be satisfactory for every employee, irrespective of his position on the floor space; (*b*) the windows, both in side walls and in roof spaces, should be such as to insure a uniform condition of the natural illumination over the entire floor area; (*c*) the intensities of natural light, even with the extreme variations throughout the ordinary period of a day, should be such that artificial light will not be required at those portions of the day when its use would naturally not be considered necessary; (*d*) the quality of the light transmitted to the work through the windows should be without glare, due to direct rays of the sun. Where glare may exist, some form of protection should be provided, such as shades or awnings; (*e*) factory interiors should always be maintained in a light color, particularly ceilings and upper portions of walls, so as to aid the illumination effect produced by the windows.

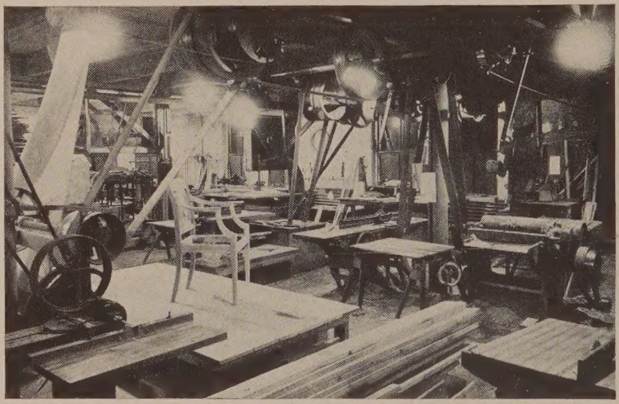


Fig. 2. Artificial lighting with Mazda lamps. Note the comparative freedom from shadows on the illuminated surfaces. A factory space with line shafting and belts impose special difficulties on the lighting problem.

WINDOW ARRANGEMENTS

To produce adequate natural lighting, several schemes for the windows may be employed. The most common is that of side-wall window areas. Roof windows are utilized in one-story structures or for the upper story of multiple-story buildings in a variety of ways. A combination of adequate side-wall window area with a modern roof-lighting arrangement may be made to furnish excellent diffused light to the working surfaces without glare, and in such quantity that even with the large variations of the natural light throughout any given day very little artificial light is required.

Special trusses have been designed for improving both the ventilation and the illumination of factory buildings. One of these is shown in Fig. 1 in that portion of the foundry visible to the extreme right of the view. By a careful arrangement of the roof windows it is possible to illuminate buildings of almost any width and depth with practically a uniform degree of light throughout.

Where side-wall windows must be depended upon as the sole source of natural light, it is considerably more difficult to make the illumination conditions uniform through a wide building. In such cases prism glass is sometimes used with good effect for the purpose of redirecting the light, which reaches the vertical windows at small angles with the vertical, into the factory at angles which will insure the lighting of working spaces more remote from the side-wall windows than otherwise.

ARTIFICIAL LIGHTING

The marked developments in artificial lighting during the past few years has been due very largely to the improvements in the types and styles of gas and electric lamps. In the electric field the two types which stand out most prominently at present for industrial purposes are the Mazda, or tungsten, lamps and the mercury vapor lamps.

The Mazda lamp in its earlier form consisted of a lamp with a glass bulb from which the air was exhausted. This form was known as the "vacuum" type, and has been given the trade indication of the Mazda "B" lamp to distinguish it from the more recent development, which is given the trade indication of the Mazda "C" lamp. In the latter form the bulb of the lamp contains gas, so that it is sometimes termed the "gas-filled" lamp.

To-day there are on the market eight sizes of the Mazda "B" lamp, ranging from 10 to 100 watts each, and eight sizes of the Mazda "C" lamp, ranging from 75 to 1,000 watts each. It is hardly possible to emphasize too strongly the importance to the industrial lighting field of these new high-efficient incandescent lamps. Their use, however, must be attended with some caution because of the great brilliancy of the latest types, and also since, without suitable reflectors, the actual illumination effect from these modern lamps on the working surfaces will be likely to be disappointing.

The mercury vapor lamp of the Cooper Hewitt Electric Company, as the other prominent industrial type of electric unit, is made in a variety of sizes, both for alternating and direct current circuits, and the best results are usually secured when these lamps are mounted overhead, so that their light is distributed over a relatively large floor area.

Developments corresponding in a general way to those in the electric-lamp field have also taken place in recent years in the gas-lamp industry. It is surprising to note the excellent results which have been obtained in numerous factory installations through the use of modern gas lamps and the reflectors and other auxiliaries designed for use with them under industrial surroundings.

SYSTEM OF LIGHTING

The arrangements of lamps for factory lighting systems may be divided into two main classes, namely, the use of the lamps well overhead so that the entire floor space is more or less uniformly lighted. This is now commonly termed the general system of illumination, to distinguish it from the other method of employing the lamps close to the work in the form of local units. In other cases a combination of the local and general systems is employed, that is, some general lighting is installed, but considerable dependence is placed by the workmen upon the local lamps close to their individual work.

A good deal might be said in favor of the general system of illumination both in its relation to production in the modern factory and also as a factor in accident prevention. The two cases illustrated in Figs. 2 and 3 will serve to indicate something of the excellence which may be secured by the general system of lighting. In each of these cases note particularly the absence of drop or local lamps. The increased facility with which employees may get about under such lighting conditions is apparent from these two views.

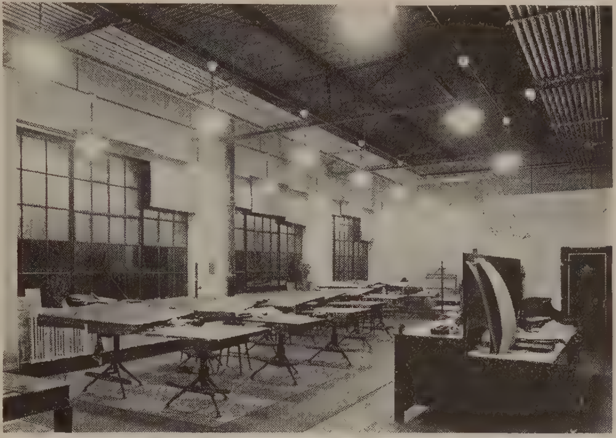


Fig. 3. Enclosed fixture lighting in a drafting-room where Mazda lamps are employed for the artificial lighting. Note the symmetry of the arrangement of the lighting units and the freedom from drop-lamps of any kind near the desk surfaces.

While quantity of light is not the sole criterion of the success of a system, nearly every one is interested in how much illumination is required for given operations. This is a matter which is difficult to stipulate, because it depends not only on the class of work involved, but also upon the personal factor of the individuals who are to use the light. However, considerable work has been done to standardize the quantities of illumination ordinarily required for given classes of work, with the result that several States have issued rules or codes of factory lighting in which the quantities of light for specific cases are set forth.

Owing to the multitude of the kinds of work conducted in the various industries, it is the usual practice in such tables to limit the specification of quantity to a relatively few general cases, with the idea that the designer of the lighting system can judge for himself when the quantity should be higher or lower than the values set forth in the given tables. As an illustration of this manner of specification, one of the codes referred to divides manufacturing into four broad classes, namely, rough manufacturing, rough manufacturing involving closer discrimination of detail, fine manufacturing, and special cases of fine work.

Minimum values for the intensity in these four classes are given respectively as 1.25, 2, 3, and 5 foot-candles, with ranges in each case as follows: 2 to 4, 3 to 6, 4 to 8, and 10 to 15 foot-candles. These values are given here merely as illustrative of the kind of work which has been done to date to standardize industrial lighting. The unit here used (the foot-candle) is the common unit of illumination intensity, and may be defined as the intensity of illumination on a surface one foot distant from a source of one candle-power. For ordinary reading, the intensity on the printed page should be approximately 2 to 3 foot-candles.

The exact planning of industrial lighting systems is a fairly complex problem because of the many factors which enter into the satisfactory solution. The importance of the best lighting to the industry usually warrants, therefore, the attention of an expert. In the design of the lighting for new factory buildings this expert need not, however, work independently of the architect, but the preferable plan is for the lighting expert and the architect to co-ordinate their efforts, since the outlines and general interior arrangements of a structure often have an intimate bearing on either the artificial or the natural lighting results. It is also most desirable for the architect to include lighting as one of the factors to be given consideration in the preliminary plans and not to delay its consideration to such an extent as to make it an afterthought. Many otherwise excellent buildings have undoubtedly been rendered greatly inferior by this latter course, whereas, with the efficient lighting equipment available to-day, adequate attention to the plans of the system in advance will tend to the avoidance of such difficulties.

Book Reviews

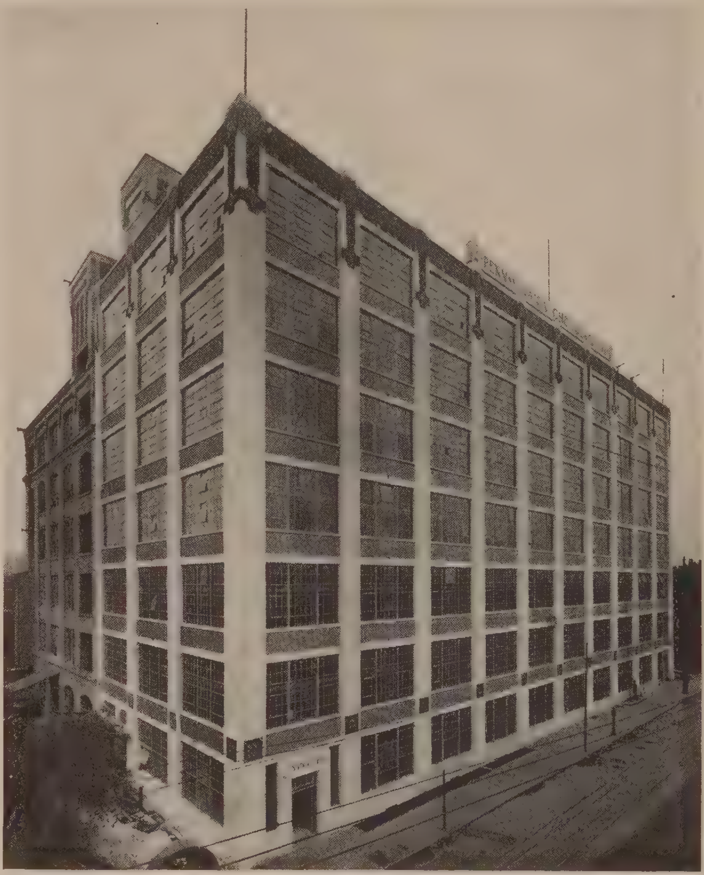
The English Home from Charles I to George IV. Its Architecture, Decoration, and Garden Design. By J. Alfred Gotch, F.S.A., F.R.I.B.A., author of "Architecture of the Renaissance in England," "Early Renaissance Architecture in England," "The Growth of the English House," etc. With upward of 300 illustrations from photographs, drawings, and engravings. 8vo. Cloth. $13.50. New York, Charles Scribner's Sons; London, B. T. Batsford, Ltd.

This volume takes up the story of the English house from the conclusion of the author's former book on "Early Renaissance Architecture in England," bringing it down to the beginning of the nineteenth century.

In no country have the homes of the people been held in more veneration or more intimately and characteristically expressive of national taste and domestic habits of life. Beginning with the advent of Inigo Jones, there was a marked revival of the old spirit in the architecture of England, and "it is this impulse and its consequences which form the basis of this inquiry." From the evolution of the modern house the author follows the various changes, pointing out the great influence of Inigo Jones, the drawings of Jones and John Webb, the work of Sir Christopher Wren, the great houses and gardens of the eighteenth century, Georgian houses, smaller houses, town houses and exterior features, decoration and interior features of eighteenth-century houses. The comments and many illustrations on various details—clock-towers, gates and screens, gate-piers, steps, and gateways, doorways, ornamental ironwork, leadwork, staircases, panelled walls, wall-coverings, fireplaces, fire-grates, chimneypieces, ceilings, plaster ornaments—are especially interesting. Of the illustrations, the original drawings contained in some famous collections, those of Inigo Jones, John Webb, Smithson, and others, have rare value. They have been obtained by special permission from the Royal Institute of British Architects, the Duke of Devonshire, and others. The book is a rich mine of examples from original sources and will prove a valuable reference in the library of the architect and for others who are interested in the story of the most personal of the arts.

The Architectural Treatment of Utilitarian Structures

Manufacturing Building of the Pennsylvania Chocolate Company, Pittsburgh, Penna.



Factory, Pennsylvania Chocolate Company, Pittsburgh, Penna.

ONLY within very recent years has the manufacturer given serious thought to employing an architect to design his industrial establishment. Formerly, such professional services were not thought necessary to secure the most economical and practical plan, design, and construction of factory buildings, warehouses, etc. What is even more surprising is the fact that the architect himself deemed the study of such structures not only beneath his professional dignity but also unworthy of his serious attention. A purely utilitarian building of this sort was considered to be entirely within the province of the ordinary builder; something he could plan, construct, and supervise as well as, or even better than, an architect.

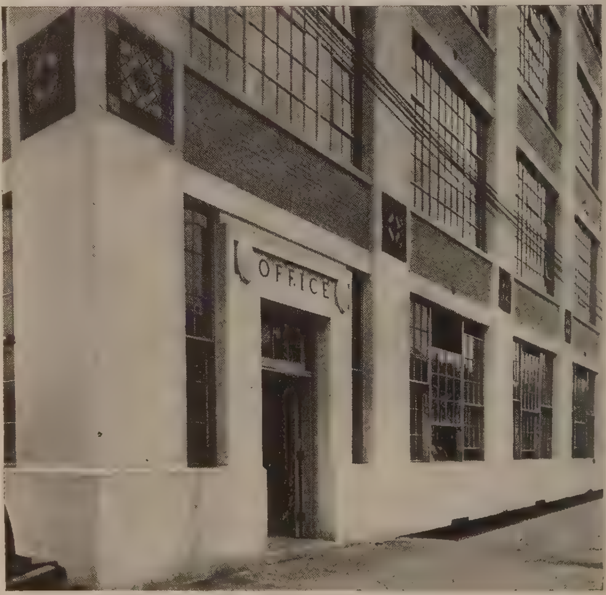
To-day, these conditions are reversed. The wide-awake manufacturers insist upon securing the best architectural advice in both the plan and the design of the exterior as well as in the construction. They realize that, to obtain the maximum in production and the utmost in skill and efficiency from the workmen, their buildings cannot be ignored architecturally. Furthermore, they have learned that a suitable exterior architectural treatment is advisable not alone for its economic value but also for the favorable impression it makes upon customers and as an advertisement to the public.

It is an established fact that employees produce more and better work in well-lighted, well-ventilated, sanitary, hygienic, and architecturally pleasing surroundings than where these elements are lacking. The accompanying illustrations show how successfully Messrs. Ballinger & Perrot, architects and engineers, have recognized and grasped the opportunities presented to embody all these features in the fireproof, reinforced-concrete manufacturing building for the Pennsylvania Chocolate Company, Pittsburgh, Penna.

The successful architectural treatment of a purely utilitarian structure, such as a modern factory building, does not imply or necessitate the lavish use of ornament, but rather its elimination. By the proper disposition of the mass and proportions of the building, study of fenestration in relation to the arrangement of piers, including their width and spacing, texture of brick and concrete surfaces, and the sparing use of ornament properly placed, the result obtained will be strictly architectural. This idea is exemplified in the building illustrated herewith. Whatever enrichment it may possess has been obtained solely by the use of tile patterns of a harmonious, yet simple, color scheme in combination with brickwork selected for its texture and laid up with raked-out joints.

A feature of noteworthy interest is the sign which surmounts the parapet. It is entirely of concrete and has been designed as a coherent part of the façade, in contradistinction to the usual procedure of forcing the manufacturer to advertise both his business and his building by erecting such monstrosities as the signboards ordinarily used.

Although severely plain, in recognition of its purpose as an industrial establishment and because of its strictly utilitarian limitations of simplicity and economy of construction, this building is not without architectural merit.



The Industrial Architect of To-Day

By F. E. Davidson

A. I. A., Member American Society C. E.

THE successful industrial architect of to-day is an *organization.* The speed demands of modern business, not only in the preparation of plans and specifications, but in actual construction work, have compelled every architect who specializes in industrial work to build up an organization of technical experts, the architect himself devoting his efforts to the co-ordinating of the work of his assistants.

Obviously the industrial architect of to-day, and probably to a much greater extent in the future, must have, in addition to the attributes of the successful designer, the knowledge and experience of many closely allied professions and trades. He must also be a successful business man. He must be an efficiency and production engineer, a real-estate expert, and must know contract law. He must be a structural engineer, an illuminating engineer, a ventilating engineer, a mechanical engineer, an insurance engineer, as well as a sanitary engineer; not necessarily able to qualify as an expert in each particular branch, but he must have a broad, general working knowledge of all of the professions and trades allied to architecture or, as I maintain, those so-called professions and trades which are a part of architecture and are properly grouped under the general heading of architecture.

Many clear thinkers are to-day maintaining that in addition to all of the above the architect of the future must perform all the functions now performed by the contractor. I am not convinced that this enlargement of the work of the architect is either desirable or necessary. I maintain that the contractor's organization occupies a very necessary part in the building industry, but I maintain that the architect, to succeed, must not, as he now so often does, turn over to the general contractor much of the work and responsibility properly belonging to him. Any architect who agrees to perform complete professional services is obtaining money under false pretenses when he furnishes anything less than such services, and is, therefore, guilty of dishonest practice morally and, I believe, legally.

Too many architects, when they happen to secure a commission to design an industrial building, proceed on the theory that anything is good enough in the way of plans, specifications, and working details; whereas no architect ever had a more critical client than the successful business man who intrusts his architect to design and supervise the construction of a large manufacturing plant, and in no class of work will the results of careful planning and designing be more greatly appreciated or bear greater results. I do not know of any work intrusted to the modern architect where the most painstaking care taken in the general planning of the work means more to a client as well as to the general community than time spent in the designing of factories and workshops.

The conditions under which a large percentage of our people are compelled to labor and live six days out of every week, year in and year out, is certainly as important as the designing of a moving-picture house or of a place of worship, which they may occasionally occupy for about one hour a week; and yet how many architects feel and apparently work upon the assumption that anything is good enough for our factory employees.

In order that the architectural profession may be intrusted with the design and construction of the industrial work of our nation in the future, it must be able to not only design better buildings but more economical buildings than the contracting engineers, as Mr. Albert Kahn so ably stated at the last convention of the American Institute. "The whole problem must finally be a matter of 'survival of the fittest.'

"There is just one way for the architectural profession to meet the situation, and that is by serving the owner better and more efficiently than do contractors—by planning better buildings, by working more assiduously, more interestedly, by designing more economically, and by obtaining results more direct and more efficient than the contractor. If we can show buildings better arranged, better constructed, at less cost, and, incidentally, more attractive; if we can handle an operation in a businesslike manner, expeditiously and without friction, shall we need to worry about lack of appreciation or recognition? Absolutely not. In just the measure that we are equipped and capable to handle the work we seek, in just that measure will it be intrusted to us.

"Service, satisfaction at all costs, sustained interest in the work at hand, strict attention to the detailed requirements of the client, a quick grasp of his needs, a prompt acceptance of his view-point, and a sincere desire to co-operate and to solve his problem for and with him—these are what he expects."

Detail, showing ornamental use of tiles, building of the Pennsylvania Chocolate Co.

The Workshop of the Gruen Watchmakers' Guild

By G. C. Burroughs, Architect

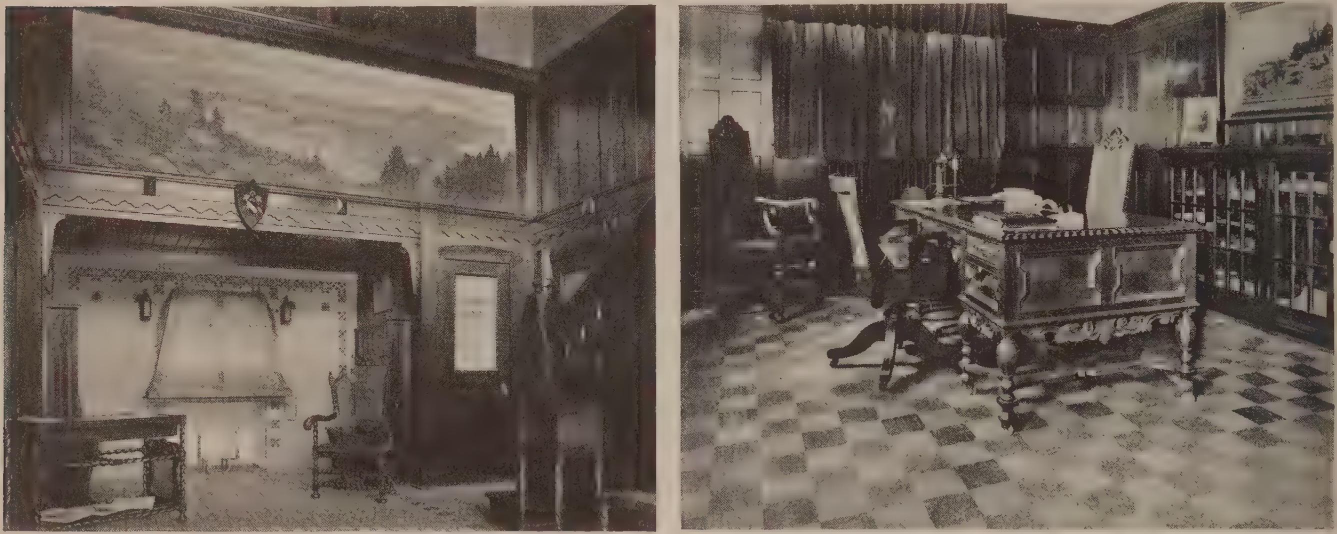
THE accompanying photographs (see also Plate CXLII) show the new workshop of the Gruen Watchmakers' Guild which has recently been built on Time Hill, Cincinnati, Ohio.

This building is known as the American Service Plant and Gold Case Shop. In this building the finishing touches are given to all Gruen watches, the movements being made in Madri-Biel, Switzerland.

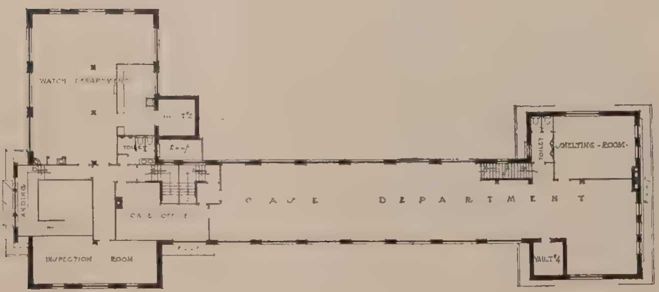
The building is one of the most modern buildings of this type. Unlike the vaulted rooms where the craftsmen of the mediæval guild of watchmakers worked by the light of candles, the watchmakers in this shop have the most modern equipment of all kinds. The building is so planned that every craftsman will have ample light and ventilation. The design of this workshop is somewhat more elaborate than usual, the owners realizing that an artist is very sensitive to his environment. The plain, bare walls and conventional lines of the average factory afford him no inspiration.

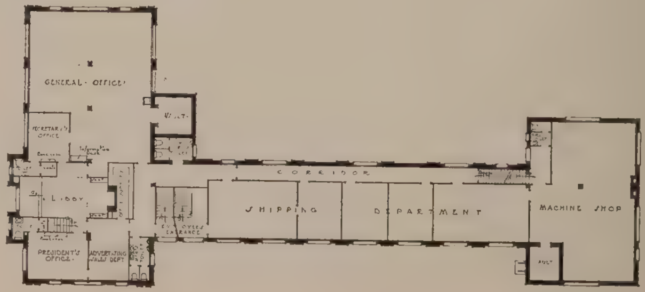
The style of building has a suggestion of the Swiss chalet with a touch of the mediæval throughout. The walls are half timber and stucco with brick base and panels. The bricks are in warm tones of red and brown with insets of Rookwood tiles in dull blue. The gabled roof is of green tile and the main entrance lobby has a distinct Alpine feeling. There is a quaint fireplace of Rookwood tiles with seats on either side, and a handsome carved stairway leads to second floor. The offices have an antique scheme of furniture and decorations. The building is fireproof throughout. The boiler-rooms and a large garage are in the basement. Third floor has storage, lunch, and recreation rooms.

The site of this American workshop is ideal, being on a rocky hill. The landscape has been worked out very successfully and completely, all slopes having a very attractive appearance. The rock work has been worked out in natural rock hillsides and there are several small lakes and waterfalls. The building is surrounded with a great deal of planting of all kinds, including evergreen Swiss shrubbery and edelweiss, and many rustic stone stairs and stepping-stone paths carried out in perfect harmony.



Details of office interiors.





Editorial and Other Comment

Architecture and Art

"THE architect of to-morrow must be not first an artist but first an organizer and administrator."

In these words Mr. C. H. Blackall pithily sums up his conception of the duty of the architect in the period after the war, in the course of an exceptionally interesting article in a recent number of the *American Architect.* This statement opens the whole question of the relationship of art and life. In his revolt against many of the fads and fripperies of American architecture, it seems to us that Mr. Blackall has gone too far to the other extreme; for although he explicitly says that in his opinion this change of attitude will not make architecture any the less a fine art, nevertheless, the implication of his entire paper seems to be that *self-conscious art*, that is, art seeking beauty for its own sake, is a merely ornamental luxury, out of tune with the stark necessities of the times. This is a view that reflects a large body of public opinion, and one that is particularly appealing to the practical common sense of American genius.

Moreover, this attitude is one which architects, albeit unconsciously, have popularized in no small measure. Increasingly of late years the architectural output of the country has consisted of large residences, designed with an ever-growing skill to serve the luxurious needs of a small minority. Despite spasmodic attempts to beautify tenements, or to produce economical and attractive suburban housing, the architectural skill of the country has been so engrossed in the building of gorgeous hotels, huge country houses, and the like, that the more practical matters of factory or loft building design, indeed, of almost all commercial design, have fallen too often into the hands of builders or "architects" to whom beauty or ugliness is a matter of comparative indifference. Similarly, housing "reform," both urban and suburban, notwithstanding the efforts of many societies, is almost completely at the mercy of real-estate speculators, so that a condition in housing has arisen which even the recent broad governmental action can only improve in certain restricted localities.

This tendency of the architects to be absorbed in working for a wealthy minority has been accompanied by a companion development of all the allied arts. More decorative painting and sculpture is lavished upon palatial homes than upon public buildings, and during the last ten years the business and profession of interior decorating has grown enormously. Even the war has seemed to furnish a new artificial stimulus to this development, producing a mushroom growth that culminated in the flaunting and delicious luxury of the current year's exhibit of the New York Architectural League, where all the designers and decorators of the city combined to show how lovely life could be made—had one but the wherewithal to pay!

It is no wonder, therefore, that many thinking men have begun to believe the artistic side of architecture the inessential side, a luxury, a mere appendage to the lives of the rich. If the *art* of architecture had no better business than the design of expensive hotels, Fifth Avenue apartments, and great villas, they would, indeed, be correct, and it would be time for the architects to forget their art and get down to the bed-rock of more practical matters.

But to us this analysis of the situation seems a little one-sided—to neglect essential facts. Beauty is one of the eternally desirable things, like virtue, or knowledge, which it alone is able to express. Mr. Blackall himself says: "The trouble with so much of our pre-war architecture was not that it was too artistic, but it was not artistic in the right sense, in that it was not fit and appropriate to its purpose." To this we would most emphatically add that there was much too little art in it, and what there was, was too much concentrated among wealthy people.

Verily it seems sometimes as though we moderns had talked more about beauty and art and had accomplished and created less than any peoples in the history of the world. Between our words and our accomplishment, what a gulf! Between the few beautiful buildings and the cities of ugliness that are tolerated around them, what a comparison! If an inhabitant of Mars should suddenly descend upon New York, with its miles of black, wasted roofs, its gaunt, spider-legged water-tanks, its roaring elevateds, its congeries of tenements, so showy outside, with tin cornice and specious ornament, and inside so terribly crowded, and dirty, and ill-arranged, we do not doubt but what he would think himself among not lovers but rather haters of beauty. It is, therefore, the more urgent that the architects do not relinquish their search for beauty, but redouble it and universalize it, and make it common not only among the homes of rich people, but in every street of every city and village. More and more the architects must follow the trail of Albert Kahn and Robert Kohn in the design of factories and commercial buildings, of Ambrose Thomas and Atterbury Smith in improving apartment-houses and tenements, of the school architects of California who are making the schools there such examples of a new and thrilling beauty. They must not be content with making all these buildings merely efficient, or with the mere careful financial and practical administration of building; they must add to those qualifications a passionate love for beauty, an absolute refusal to be satisfied with any design, no matter how efficient, no matter for what practical purpose, unless it is a design which shall not only do its work, but also enrich the lives of all who see it through its beauty.

Moreover, the world at the conclusion of the war will be faced with such dire needs for the most practical and essential things of life, that there is danger enough of the love of beauty becoming deadened in the struggle to obtain them. The period of reconstruction after the Civil War was a period of the lowest artistic depths to which this country has ever sunk. Facing a period of reconstruction at the present time that bids fair to be so much more sweeping, so much more universal, so much more difficult, does it not behoove every architect to rededicate himself to the service of beauty, to the end that no such period as that of 1865–1875 ever return, and that the spiritual Renaissance for which we all hope may have its legitimate æsthetic expression, without which it would be incomplete!

The Law of Supply and Demand

By Archibald N. Jordan

WHILE the theory of supply and demand as set forth in text-books on economics, viz.: the higher prices rise the greater will be the supply and the less the demand, is a general law that operates under ordinary conditions, we must consider the application of it under extraordinary conditions, when theory cannot always safely be applied to practice.

The operation of supply and demand to-day requires keener analysis than a general statement in a text-book can give.

During the period of a world-wide rise in prices generally there is to be observed a tendency on the part of the majority of producers to increase their production by enlarging their plants. This adds to the consumption of materials and employment of labor, drawing heavily on the existing supply of raw materials and taking labor away from the production of raw materials. Consequently there is a decrease in the net supply of raw materials for use in the construction of plants, instead of, as the economists claim, an increase. While the confidence of producers, as expressed in the enlargement of their plants, exists, this tendency to decrease the net supply of construction materials continues. Ultimately prices rise to such an excessive degree that this confidence in new construction is lost, and then the law of supply and demand operates as usually expressed, and with increased vigor, resulting in an oversupply and a commercial crisis due to falling prices.

At present, when the necessity for increasing our war materials is so pressing, this tendency of decreasing the net supply of materials is most obvious, and the law of supply and demand does not operate in accordance with the usually expressed theory. Under the pressure of national danger the excessive demand practically suspends competition, and deliveries, not prices, are supreme.

No matter what the demand is, the country cannot grow more rapidly from year to year than the net annual surplus of materials and labor (the result of each year's turnover) permits. The net annual surplus resulting from the year's turnover of the world's business activities is the limit of the extent to which materials may be used for new construction, or growth, and the employment of this annual surplus in new construction is limited to the amount of labor (producers) that may be taken from existing operating plants without decreasing the output and upkeep of those established industries. Any faster than this we cannot grow, for no matter how much prices are increased in bidding for materials, the supply cannot be increased. The only result of providing more credit is to increase the amount offered for supplies but not to increase the supplies. It merely ends in higher prices and increased cost of living. The fact that the supply of one or more than one article may increase during this period of general decrease in the supply of construction materials does not alter the general movement of decreasing supplies.

Architectural League Competitions for the Henry O. Avery Prize for Sculpture, 1918

A Prize of $50 Presented by the Late Mrs. Samuel P. Avery, in Memory of the Late Henry O. Avery, and a Special Prize of $300 for the Best Design Submitted by an Architect, Sculptor, and Mural Painter in Collaboration

SUBJECT

TWO spaces have been assigned in the coming exhibition of the Architectural League on either side of the steps approaching the Vanderbilt Gallery for the installation of two jardinières in arched recesses as per diagram. The design of one of these is the subject of this competition.

The jardinière and its support are to be of stone, faience, or metal, and the back, sides, and soffit of the recess, or niche, together with the space surrounding it, as indicated in the diagram, are to be treated as part of the design in any material desired.

The jardinière or its support must include in its design a sculptural representation of the human figure or of animal life.

The form of the recess and its dimensions, as shown in the diagram, must be adhered to. It must not exceed 2′ 6″ in depth, and no portion of the jardinière may project more than 6 inches beyond the face of the wall.

Competitors shall submit:

A. A sketch in color at a scale of 1″=1 ft.

B. A sketch model of the jardinière and its support at a scale of 2″=1 ft.

These drawings and models, and no others, are to be delivered, unpacked and carriage paid, on November 1, 1918, at the rooms of the Architectural League, No. 215 West 57th Street, New York City, addressed to the Committee on Competitions and Awards.

From the designs so submitted the jury, not later than November 10, will select the two which in their judgment are the best, and the authors of each of these two designs shall receive the sum of one hundred dollars to cover the cost of producing their design at full size and installing same in the exhibition. The production of these designs at full size does not necessarily imply the execution in the actual materials but merely a sufficiently complete indication of form, color, and texture to enable the jury to judge of the finished effect.

The judgment for the special "Collaborative" prize and for the Avery prize for sculpture will be confined to these two designs. In order to be eligible for the prizes and for the appropriation of one hundred dollars, these designs must be ready for installation in the exhibition not later than January 15, 1919.

Cleland Heights Housing Development, Wilmington, Del.

By John D. Thompson, Jr., Architect

IN the development of the plan of Cleland Heights, the workmen's new suburb of Wilmington, Del., the natural characteristics of the location were utilized to the fullest extent. See Frontispiece and Plates CLVI and CLVII.

The park system of 300 acres bounds two-thirds of the tract, in the form of a semicircle on the north and northwest, and the city streets abut its eastern boundary; along the south line extends Maryland Avenue, formerly the Baltimore Turnpike, an extension of one of the city's main arteries.

The two principal city streets have been extended into the plot in such a manner as to intersect the main axis at Liberty Circle; these two streets are direct routes from the southwest section of the city to the above-mentioned park lands.

The main axis, Community Avenue, extending northwest from the exact intersection of Maryland Avenue, Broome Street, and Coyne Road, will be 160 feet wide, with stores and markets erected in the centre; over stores and markets will be an apartment in the second story.

A comfort station, also a news and waiting pavilion are located at this intersection of Maryland Avenue; the latter will also have a gasolene station for supplying autos en route between Baltimore, Washington, and Wilmington.

Beyond Liberty Circle, Community Avenue is 100 feet wide, with a 20-foot grass plot in its centre. It extends to the City Park, where an ornamental entranceway will be erected.

Liberty Circle is a park 150 feet in diameter elevated above the streets about 5 feet. A natural spring near the intersection of Dupont and Banning Streets will be piped to this park and formed into a fountain.

Not only have the natural characteristics of the location been used, but the streets will be so graded as to retain the contour of the ground to a great extent, which the farmer calls rolling—there will be no grades of more than 5½ per cent; this means good surface drainage, clean streets, and a good place to dwell in.

The buildings of a public character, churches, schools, town hall, fire-engine houses, etc., are grouped around Liberty Circle in such a manner as to produce a civic centre.

At Dupont and Banning Streets, in the City Park, is one of the most extensive playgrounds and athletic fields in the State of Delaware.

The type of houses to be erected in this project will be varied, from a bungalow with just a few rooms and the 5 or 6 room house, up to houses with as many as 8 and 9 rooms, and the houses will also be varied in architectural design of both interior and exterior. They will all be different and as beautiful as modern skill knows how to make them.

The designs of the houses are distinctive, and when carried out will make Cleland Heights a section of model homes which will be a credit to the city. The houses will be provided with all modern conveniences. A large number of the houses will have sufficient space, and provision will be made for private garages, in addition to which there will be a public garage and service-station.

Altogether there are apartments and private houses to accommodate 800 families, besides stores, moving-picture theatre, public waiting-room, and land will be left in the plot for the erection of churches, school, a kindergarten, a fire-engine house, individual garages, and a circle for the erection of a proposed monument. In conjunction with the business section, to which all business will be restricted, provision has been made for a warehouse on a railroad siding, which will permit of community-buying in carload lots.

Provision has also been made for the establishing of a station for passengers or workmen who desire to avail themselves of the opportunity of utilizing the steam railroad in getting to their work. These steam roads run direct to the gates of the shipyards.

Besides the steam roads, two trolley lines make it possible for any resident of Cleland Heights to have ten-minute trolley connection with the centre of the city. The Maryland Avenue trolley line takes care of all residents living on the southern and western sides of the tract. The South Harrison Street line takes care of those on the northern and eastern sides of the tract. Besides this, the land is close enough to permit workmen to walk to their work.

Cleland Heights is one of the highest elevated tracts in this locality, affording a view of from five to eight miles over the Delaware and Christiana Rivers as well as over the entire city and surrounding sections.

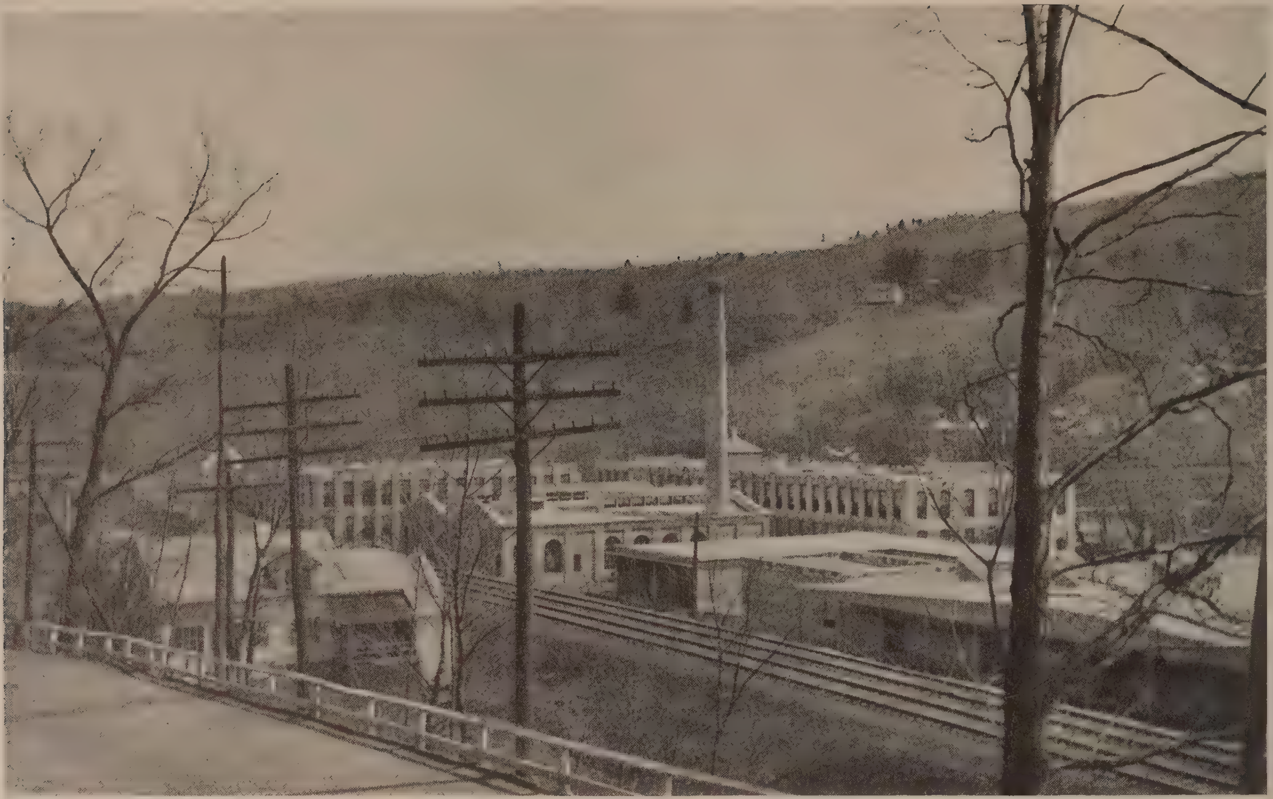
It has the city sewers on the lower or southwest side of the property, while a trunk-line sewer extends to it on Maryland Avenue. It also has city gas, electric, and water service. See Frontispiece and Plates.

The Personnel of the Production Bureau, Housing Division, United States Shipping Board, Emergency Fleet Corporation, 253 North Broad Street, Philadelphia, Pa.

A. Merritt Taylor, Director of Passenger Transportation and Housing.
J. Willison Smith, Assistant Director of Housing.
Robert Jemison, Jr., Executive Assistant.
Robert D. Kohn, Chief of Production Bureau.
E. J. Russell, Deputy Chief of Production Bureau.
Frank Goodwillie, Deputy Chief of Production Bureau.
D. Everett Waid, Deputy Chief of Production Bureau.
F. Mathesius, Jr., Chief of Project Supervisors.
H. B. Upjohn, Assistant.
W. P. Bannister, Assistant.
E. N. Adams, Statistician.

PROJECT SUPERVISORS

E. S. Klein.
A. Mackintosh.
G. W. Ritchie.
E. C. Wachendorff.
L. A. Goldstone.
R. B. Stacy-Judd.
E. R. Will.
R. B. Derby.



Washburn & Heywood chair factory, Erving, Mass.

Expert Service in the Design of a Manufacturing Plant

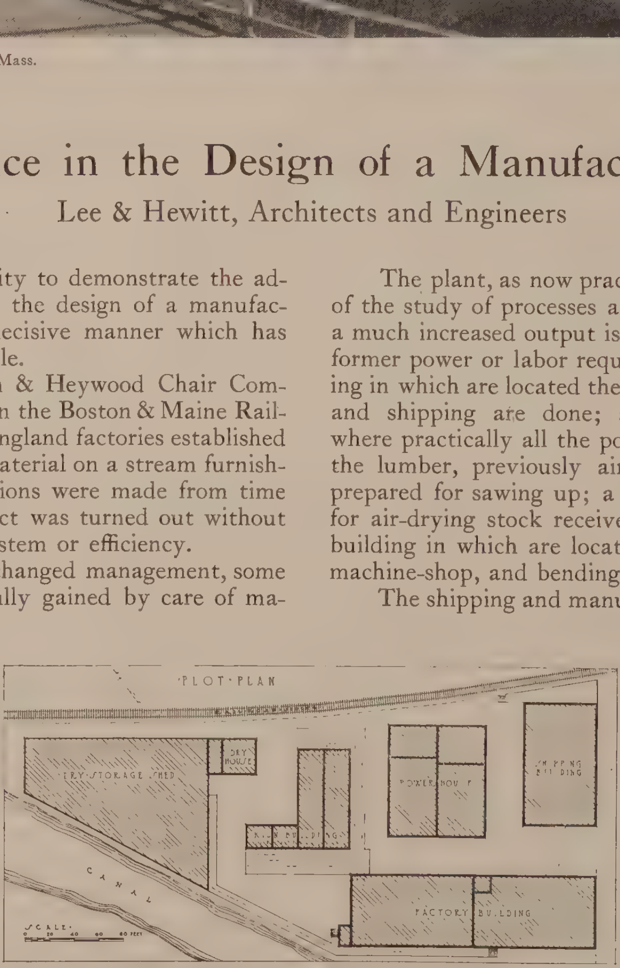
Lee & Hewitt, Architects and Engineers

IT is seldom that an opportunity to demonstrate the advantages of expert service in the design of a manufacturing plant is offered in the decisive manner which has arisen in the subject of this article.

The plant of the Washburn & Heywood Chair Company, located at Erving, Mass., on the Boston & Maine Railroad, was typical of many New England factories established in the midst of a supply of raw material on a stream furnishing water-power, to which additions were made from time to time and in which the product was turned out without much thought being given to system or efficiency.

A year or two back, under changed management, some increase in output was successfully gained by care of machinery, but the conditions generally were unfavorable.

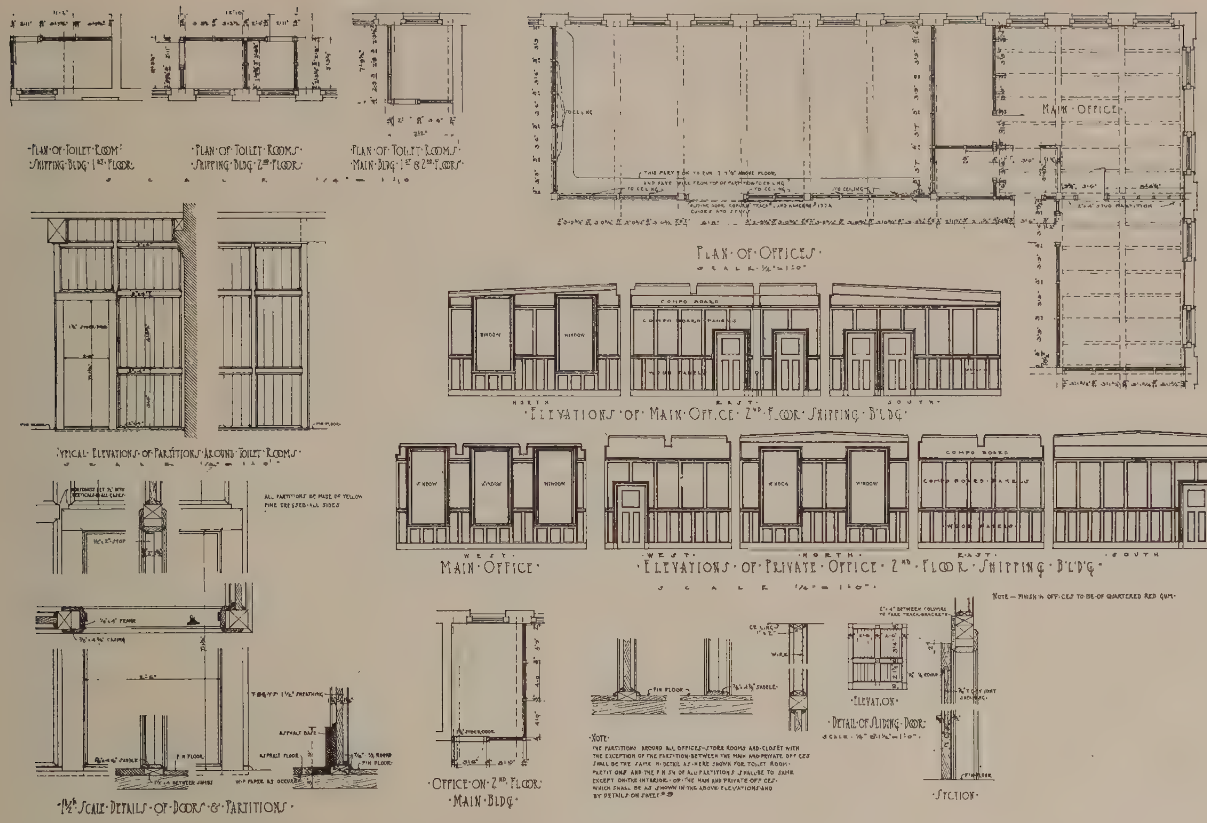
Shortly after this was attempted, two fires within a week completely destroyed the plant. Owing to the supply of material standing available in the woods on the surrounding hills, it was determined to rebuild the plant, and along lines giving the greatest efficiency in operation for a predetermined output.



Plot plan of plant.

The plant, as now practically completed, is the product of the study of processes and routing of materials in which a much increased output is expected at no increase over the former power or labor requirements. It consists of a building in which are located the offices and in which the finishing and shipping are done; a main manufacturing building where practically all the power is used; a set of kilns where the lumber, previously air-dried, is completely dried and prepared for sawing up; a large receiving and storage shed for air-drying stock received already cut up; and a power building in which are located the boiler-room, engine-room, machine-shop, and bending-room.

The shipping and manufacturing buildings are two-story structures of heavy, slow-burning mill construction and are connected by a bridge at the second-floor level; the kilns are entirely of fireproof construction—brick, tile, and cement; the storage shed is of wood and so constructed as to permit free access of air through all sides and floor; the power-house is fireproof in every particular—brick walls, steel roof framing, and non-conductive roof slab.


·Plan·of·Toilet·Room·
·Shipping·Bldg·1st·Floor·

·Plan·of·Toilet·Rooms·
·Shipping·Bldg·2nd·Floor·

·Plan·of·Toilet·Rooms·
·Main·Bldg·1st & 2nd·Floors·

S C A L E 1/4" = 1'0"

·Plan·of·Offices·
S C A L E 1/4" = 1'0"

·Elevations·of·Main·Office·2nd·Floor·Shipping·B'ld'g·

·Typical·Elevations·of·Partitions·Around·Toilet·Rooms·
S C A L E 1/4" = 1'0"

Main·Office·

·Elevations·of·Private·Office·2nd·Floor·Shipping·B'ld'g·
S C A L E 1/4" = 1'0"

Note — Finish in offices to be of quartered red gum·

·1½" Scale·Details·of·Doors·&·Partitions·

·Office·on·2nd·Floor·
·Main·Bldg·

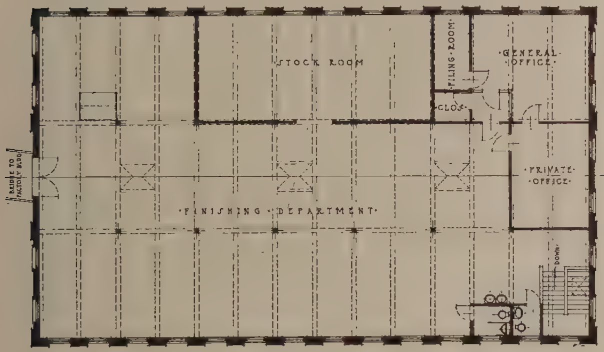
·Note·
The partitions around all offices-store rooms and·closet with the exception of the partition·between the main and·private offices shall be the same in·detail as·here shown for toilet room·partitions and·the finish of all·partitions shall·be the same except on·the·interior·of·the main and private offices·which shall be as shown in·the above·elevations·and by details on sheet #5

·Elevation·
·Detail·of·Sliding·Door·
Scale·1/4" & 1½" = 1'0"·

·Section·

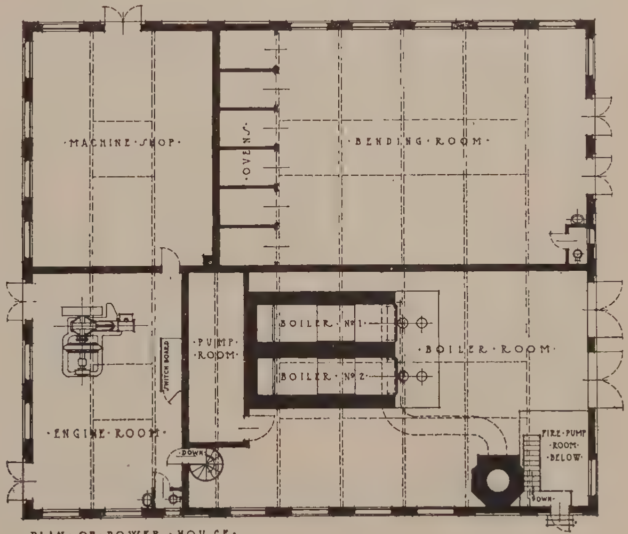
In the boiler-room are two one-hundred-and-fifty-horse-power return tubular boilers, with Dutch ovens and all the auxiliary apparatus of pumps, heaters, etc. Located in the engine-room is a direct-connected high-speed engine and alternator of one hundred and fifty K. V. A. capacity and the switchboard. Adjacent to the engine-room is the machine-shop where all patterns, dies, and repairs to machines are cared for.

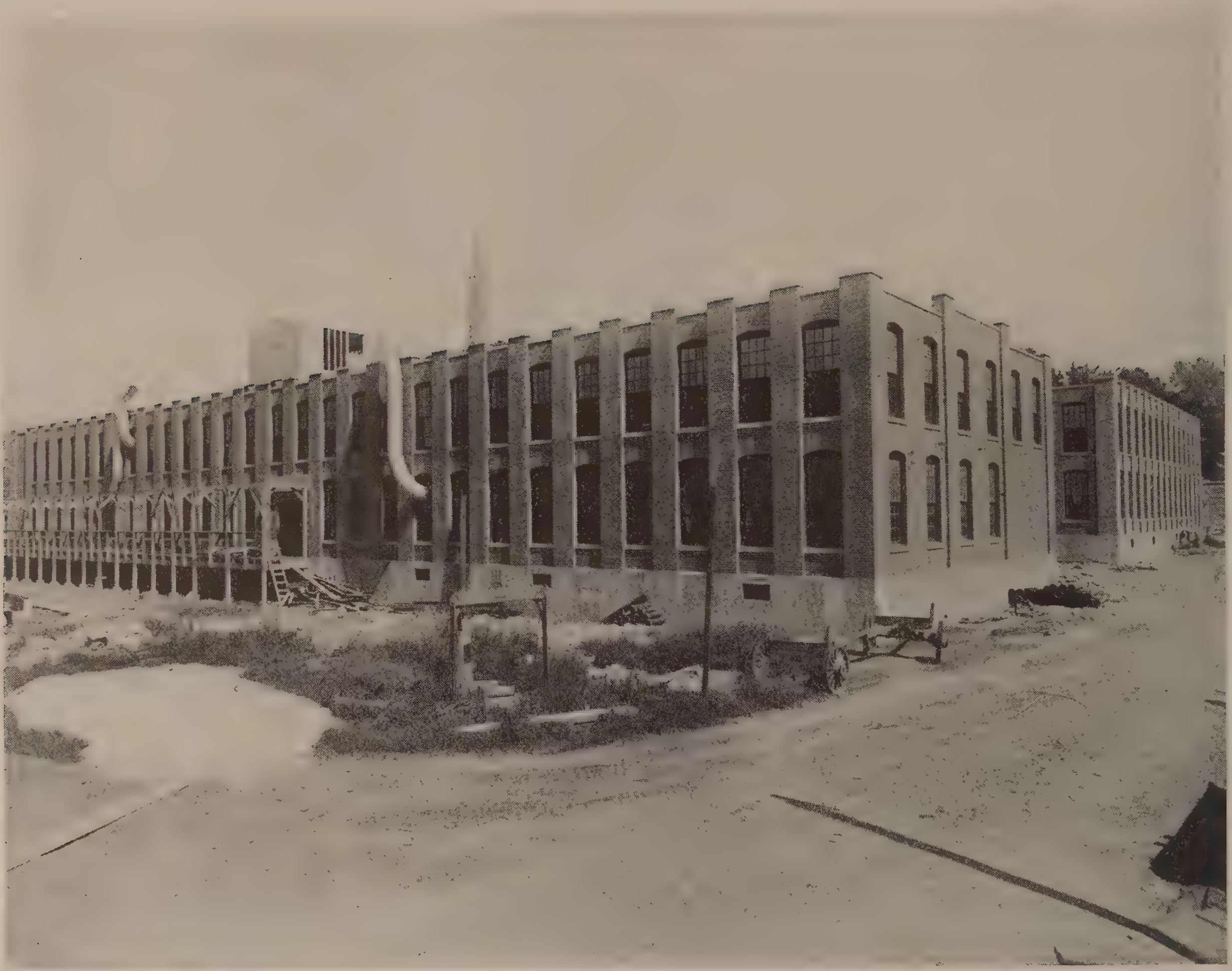
Side by side with the boiler-room is the bending-room, or department where the steaming and bending of parts incidental to the manufacture of the chairs is done. Its proximity to the boiler-room is very favorable for the use of the steam required. The roof slab of non-conducting material eliminates the dropping from condensation of vapor released during operation.


·Second·Floor·Plan·of·Shipping·Building·

The plant is effectively protected by an automatic sprinkler system and complete fire-fighting equipment of loop, hydrants, etc., with the river as source of water-supply and a one-thousand-gallon underwriters' fire-pump, located in a room off the boiler-room, furnishing the pressure.

In the process of manufacture the wood slabs are brought to the kilns, which are progressive in type and put in at one end; the corresponding amount is taken from the other into the main building for cutting up. As it progresses it is joined by the material brought from the storage shed on a telferage system and such material as must of needs


·Plan·of·Power·House·

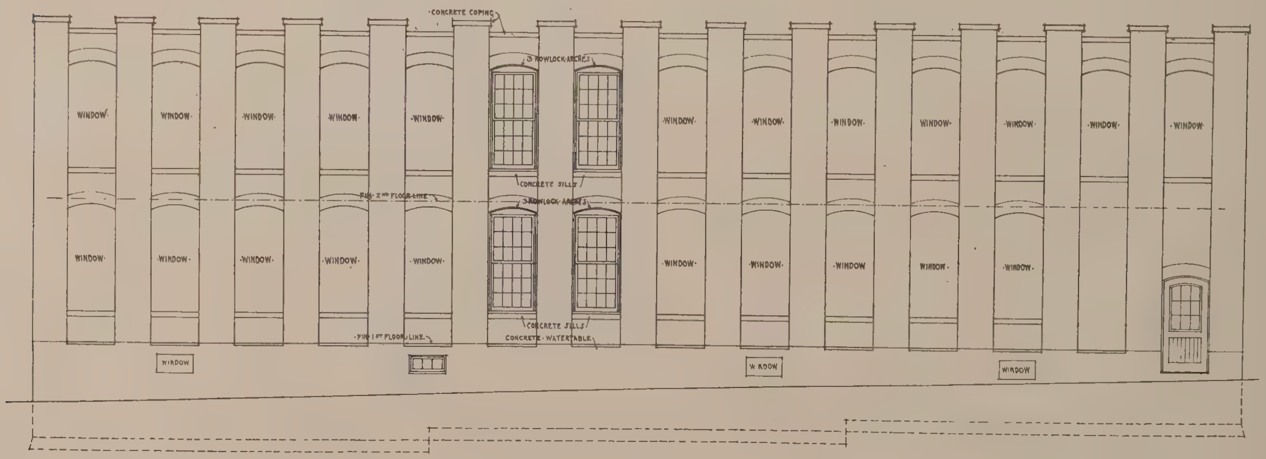


Shipping building, Washburn & Heywood chair factory, Erving, Mass.

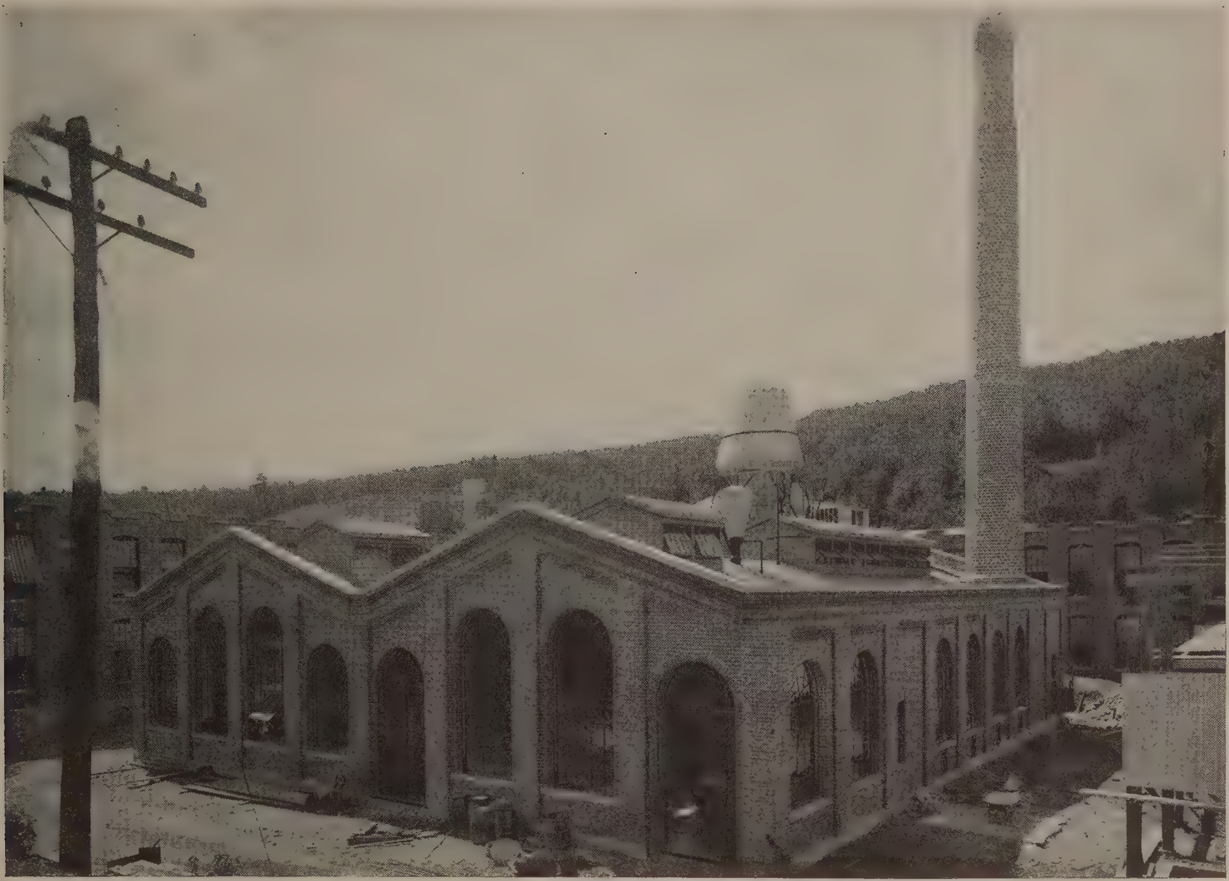
be prepared in the bending-room, and thence on to its completion and across to the finishing and shipping building.

It was estimated that the quantity of waste which the increased output would produce would furnish all the steam required for all purposes, and the water-power was not rehabilitated. In fact, in the original plant an engine was needed as an emergency source of power at times of low water in the river.

This waste is gathered in two ways: the lighter dust and shavings are collected by a blower system delivering that waste directly to the Dutch ovens; the heavier and



·EAST·ELEVATION·



Power-house, Washburn & Heywood chair factory, Erving, Mass.

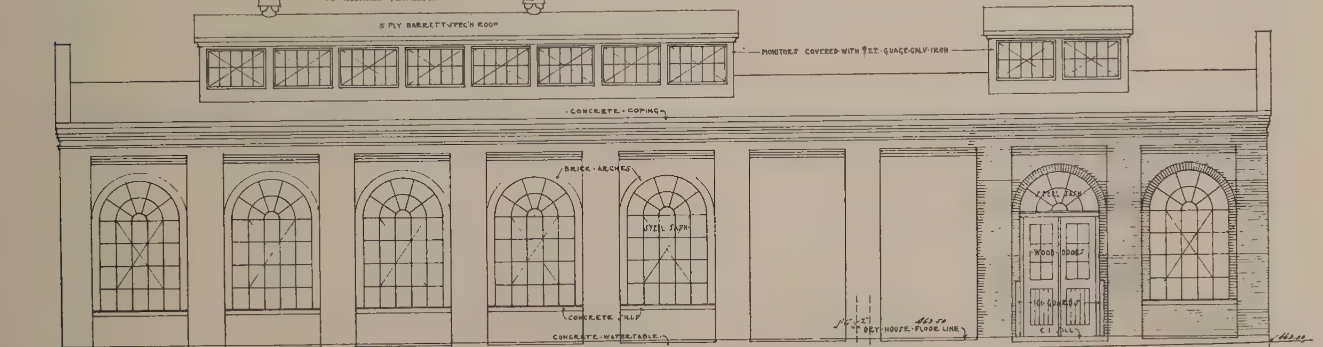
green cuttings are collected in boxes and delivered to a belt-conveyor carrying them to the boiler-room.

Study of the proper routing determined the location of machines, which are all served by individual motors, the calibrating of which will serve to redistribute them to the best advantage on the machines and raise the power-factor on the generator.

Efficiency and quality were the governing factors in the selection of all machines and apparatus.

The general construction of the plant was in the hands of the Flynt Building & Construction Company, who carried the work on under the immediate supervision of the engineers and architects.

The completed work, as the result of the collaboration of Messrs. J. H. L. Smead and F. L. Butler, of the parent corporation of Heywood Bros. & Wakefield Company, with the engineers and architects, is the most efficiently planned chair plant in the country.



·EAST·ELEVATION·

Union Park Gardens

A Model Garden City for Industrial Workers at Wilmington, Del.

By William E. Groben

THE influx of many additional shipworkers and their families to carry out the ship-building programme of the Emergency Fleet Corporation has overtaxed and exhausted Wilmington's present local housing facilities. The high charges for board and insufficient conveniences for skilled workmen and their families make it imperative to provide many additional houses.

When it became evident that such facilities were inadequate, that the erection of new homes, because of the advance in cost of labor and materials, and the uncertainty of supplies for construction work was not keeping pace with the rapid growth and expansion of existing shipyards, and that no provision was being made for housing the necessary additional workmen for the proposed new shipyards, the Liberty Land Company of Wilmington was organized to meet these requirements. After selecting and obtaining options upon several available and convenient sites, they made their needs known to the Emergency Fleet Corporation, resulting in the Union Park Gardens development, one of the many housing projects now in course of construction.

The site is located at the intersection of Union Street and Lancaster Avenue, on the outskirts of Wilmington, partly within and partly without the city, and includes about fifty acres of beautiful rolling farmland, one portion of which, adjoining the woodland section to the south, at present reserved as parkland, is wooded with magnificent trees. A brook—a special feature of the plan—flows through the tract. To the south is the parkland previously mentioned, with Lancaster Avenue and Union Street on the north and east respectively, the latter being the main highway to Baltimore and Washington.

Ballinger & Perrot, the architects and engineers, of Philadelphia and New York, associated with Mr. John Nolen, the well-known town planner of Cambridge, Massachusetts, have seized the opportunities offered by the natural advantages of the site and its unusual surroundings to produce an American garden city of exceptional merit. The site is connected with Wilmington proper and its shopping district by two trolley lines, one on Union Street and one on Lancaster Avenue, the latter giving direct transportation to and from the shipyards of the Pusey & Jones Company, Harlan & Hollingsworth, and the American Car and Foundry Company, which may be reached in ten minutes by their employees.

Grant Avenue, at present connecting Wilmington's system of public parks, has been continued through the development to the wooded park to the south. It is 120 feet wide, winding with the stream previously mentioned, on either side of which are the roadways. Where main cross streets occur small but picturesque bridges span the stream.

The town plan of Union Park Gardens, as conceived by John Nolen, has been arranged to form part of the city of Wilmington by continuing some of the present city streets through the tract.

The plans include all the essentials of a thoroughly organized town. In addition to the houses and apartments, there will be a community building and a sufficient number of shops and stores to meet local needs.

Upon the tract 506 houses, including 399 of the group type and 104 semidetached and three detached, will be erected at once. After allowing sufficient ground for the apartment-houses, stores, community building, and playground, there will remain a few lots which may later be purchased and built upon. A site has been reserved for a school-building and for baseball and tennis. In addition, an area not suitable for any building purpose, is to be devoted to allotment gardens for those who otherwise would not use their own back-yards.

The community building, with its various accommodations, has been provided because in industrial towns to which skilled mechanics and their families are brought from a distance it is as essential to provide recreation and amusement as adequate and sanitary homes. It makes for the contentment of both the working man and his family, which is the prime factor in eliminating, or at least reducing to a minimum, the labor turnover, the most serious industrial problem at the present time. This building contains an auditorium, with stage and dressing-rooms on the main floor, large enough to accommodate 1,000 persons. Here lectures, dramatic performances, moving-picture exhibitions, and dances may be given, with kitchen adjacent for serving light refreshments. At other times the auditorium will be used as a gymnasium. On this main floor are also located the club and lunch rooms, with reading-rooms opening from them, a sort of rendezvous, or forum, where the shipworkers may meet to discuss the happenings of the day of both general and local interest. The basement is devoted to game-rooms, including pool and billiards, a smoking-room, and a bowling-alley. At the rear of the auditorium balcony, on the second floor, are located the community dispensary and social-service rooms.

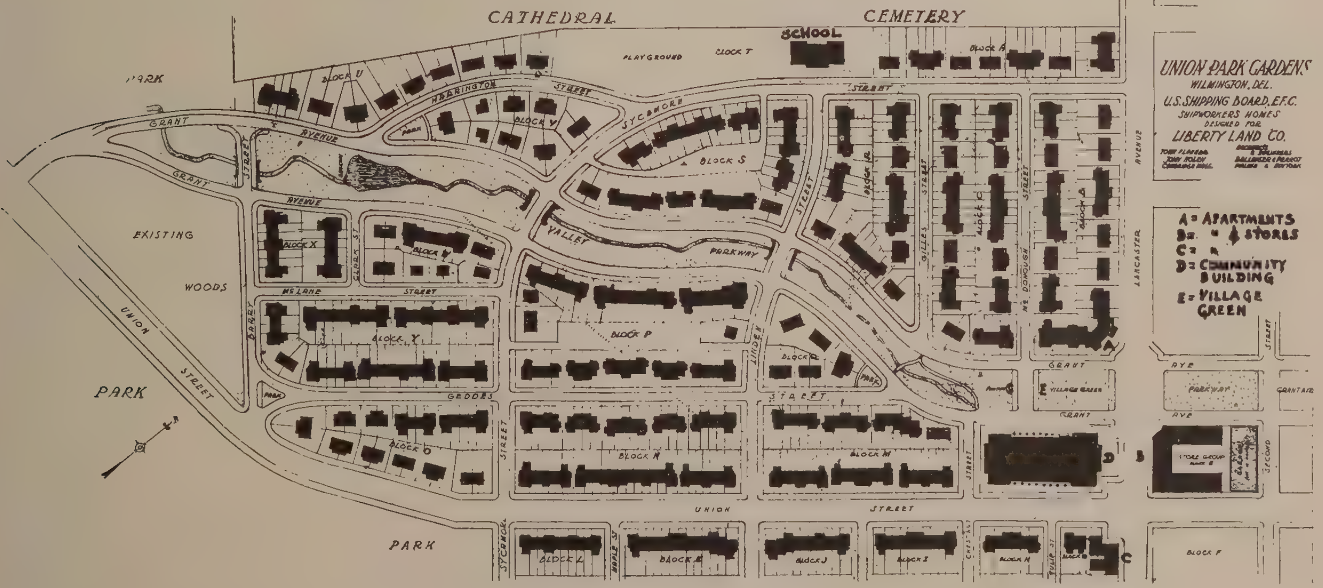
The monotonous uniformity of the row houses has been carefully avoided. In spite of the fact that the group scheme has been followed generally, charming and attractive effects in architectural design have been obtained.

For pleasing and diversified architectural effects, both varying house setbacks from the street property line and broken roof lines have been used. Gable ends and dormers have been introduced at certain irregular intervals, especially at important points like street intersections, opposite streets, etc., with good results. There are twenty different types of houses, arranged in a variety of combinations. Harmony, simplicity, and uniformity have been maintained throughout the entire scheme by adhering to one style of architecture, by limiting the types of exterior treatment, and by securing effects in mass, proportion, and lines, rather than by the introduction of useless and expensive architectural embellishments. The groups average seven houses, and in only one or two cases do they exceed ten houses. Practical knowledge, common-sense requirements, and good taste have been employed in the design to make them essentially working-men's homes, which can be built economically to

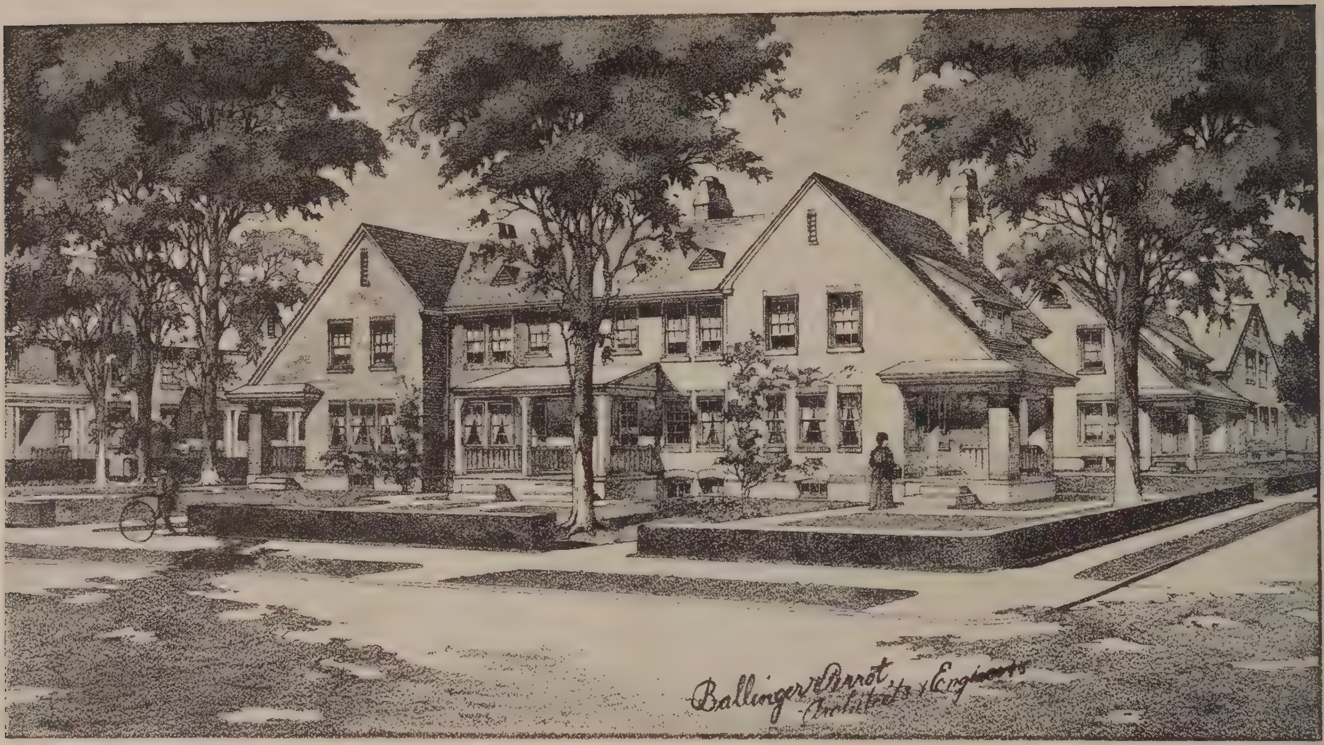
Shipworkers' homes, Wilmington, Del. For the Emergency Fleet Corporation, U. S. Shipping Board. Ballinger & Perrot, Architects.

permit of their purchase within the means of the skilled worker.

The houses, commonly known as "air-light" houses, are mostly of the six-room-and-bath type, with a front porch living-room, dining-room, and kitchen on the first floor, and three bedrooms and a bath on the second floor. There is ample attic space above the bedroom ceilings, which is well ventilated front and back to keep these rooms cool in the hot summer weather. This attic space has no living accommodations, but may be used for storage. There are a few houses of the four-room type, having a front porch, living-room, and combination kitchen and dining-room on the first floor, and two bedrooms and a bath on the second floor. The bathroom opens upon the second-floor hallway and not upon bedrooms. The plans call for ample closets in all living-rooms and bedrooms, with both gas and electricity for illumination, gas for cooking, warm-air heat, and modern plumbing and fixtures. Laundry trays are located in the basement, conforming to the local custom. While provision has been made for cooking and heating of water by gas, a hearth and necessary flue have been included in every kitchen so that, if desired, a coal range may be conveniently installed at any time. Every house has a full basement. Public utilities, including sewers, water, electricity, and gas, are being extended from Wilmington proper.



Plot plan.

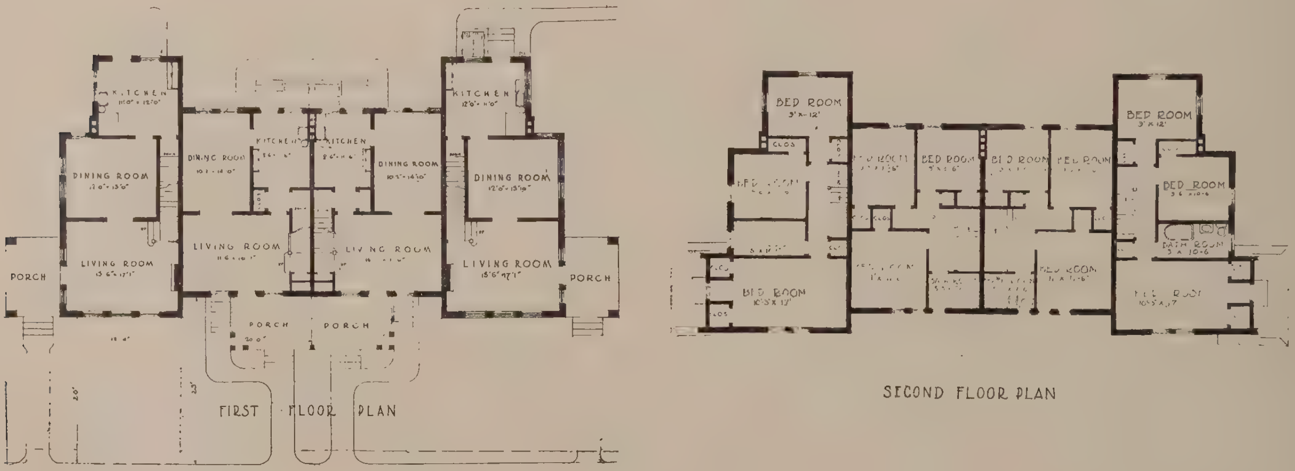


Four-family unit, Wilmington, Del.

Realizing that the houses would be larger than desired or needed by many of the married workmen without children, it has been necessary to provide thirty odd apartments, consisting of living-rooms, dining-rooms, kitchen, bedroom, and bath on a single floor. Some of the better apartments have been placed at the intersection of Grant and Lancaster Avenues, facing the village green.

Messrs. Ballinger & Perrot, the architects and engineers, have planned these houses two rooms deep, to give every room sufficient light and ventilation, with rooms of ample sizes for their various purposes, and have made the accommodations and interior arrangements, as well as the construction, conform to the requirements of the housing division of the Emergency Fleet Corporation.

Ground was broken June 25, 1918, for the first houses, all of which are expected to be ready for occupancy by fall, thereby giving a certain measure of relief to the present congested housing situation. It is imperative, however, that other housing projects be undertaken in Wilmington and its immediate vicinity to keep pace with the continued growth and expansion of the ship-building industries of that city.



Plans of four-family unit.

Electric Power-Plants

By *W. Whitehill, Architect*

THE general rule for the location of a power-plant or central station is that it shall be located as nearly as possible at the centre of gravity of the system. This is often modified by the cost of land, availability of water-supply, coaling facilities, and various local considerations.

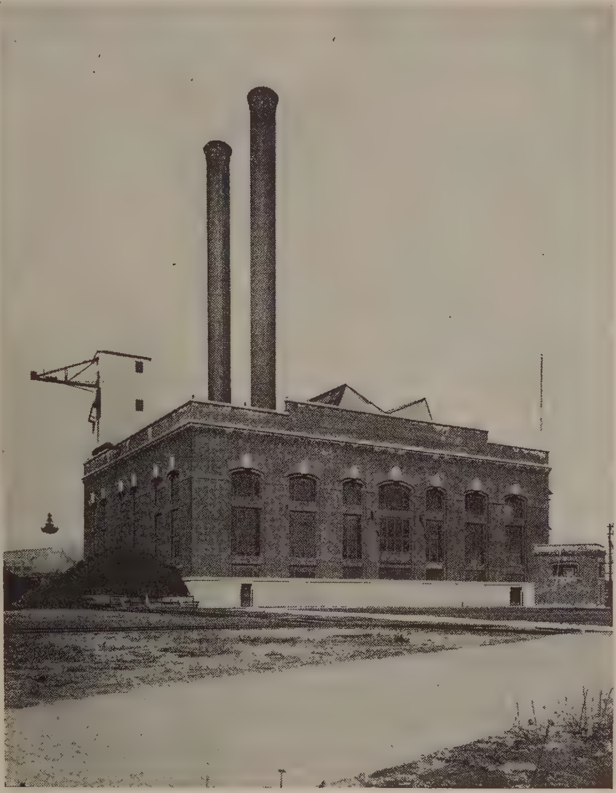
The Riverside Power-Station, Albany, N. Y., and the Miller's Ford Power-Station, Dayton, Ohio, are admirably situated to satisfy all these requirements.

Modern central-station work involves the operation of electrical and mechanical units of exceptional size, turning out immense quantities of power. Furthermore, the load on these units is governed by a wide and incessant fluctuation of demand. To maintain service, with no interruptions or shut-downs, under these conditions is the vital problem. In order to accomplish this many novel electrical, mechanical, and construction details are employed.

The Riverside Power-Station is located on the west bank of the Hudson River, in the northern end of the city of Albany, N. Y. The property has a frontage along the river of 352 feet with a depth of 631 feet running back to the Erie Canal.

The building is divided into three sections, the boiler-house, which is 120 feet long by 48 feet wide, the turbine-room, which is 70 feet long by 50 feet wide, and the electrical galleries, which are 70 feet long by 48 feet wide.

The Miller's Ford Power-Station is located on the bank of the Miami River, in the outlying district of the city of Dayton, Ohio. The property is triangular in shape, bounded by the Miami River, the Big Four Railroad, and the Miami and Erie Canal.



Riverside Power-Station, Albany, N. Y. Wm. Whitehill, Architect.

The building is divided into three sections, the boiler-house, which is 144 feet 5 inches long by 104 feet wide, the turbine-room, which is 117 feet long by 74 feet 3 inches wide, and the electrical galleries, which are 117 feet long by 39 feet 4 inches wide.

The engineering layouts of both stations were designed by Thomas E. Murray, consulting engineer.

The illustrations show the layouts of these two power-stations, which cover, in a general way, the typical arrangement of modern power-houses.

Power-houses vary in size according to the kilowatt capacity required, and the treatment architecturally varies as to location, whether it is desired to combine a show station with the practical production of electricity, and as to the amount of money per kilowatt that is allowed for the entire cost of the complete station, including the building and all mechanical and electrical apparatus.

The construction and architectural treatment is entirely confined to the housing of the mechanical and electrical apparatus together with the coal and ash handling apparatus (except in water-power plants, where coal and ash handling are eliminated).

This apparatus is of various fixed sizes, and the column centres are determined by the arrangement of same and the many other details, such as electrical cable ducts, which are built into the walls and floors. The various floor levels and the extreme ceiling heights required make it unusually difficult to produce a balanced plan or façades.

The design of power-house façades is regulated by the above conditions, and in addition it is very important to provide many large window openings to get all the light and ventilation possible. The exterior walls may be faced with a face brick or common brick laid in special bond and trimmed with stone or terra-cotta water-table, sill and band-courses, cornice, and coping. The window frames and sash are either of cast-iron or wrought-iron construction provided with the maximum amount of ventilating sash. The sash should be controlled in large units by an operating device to quickly open and close same as required. In some cases mechanical control, such as air or electric motors, are provided.

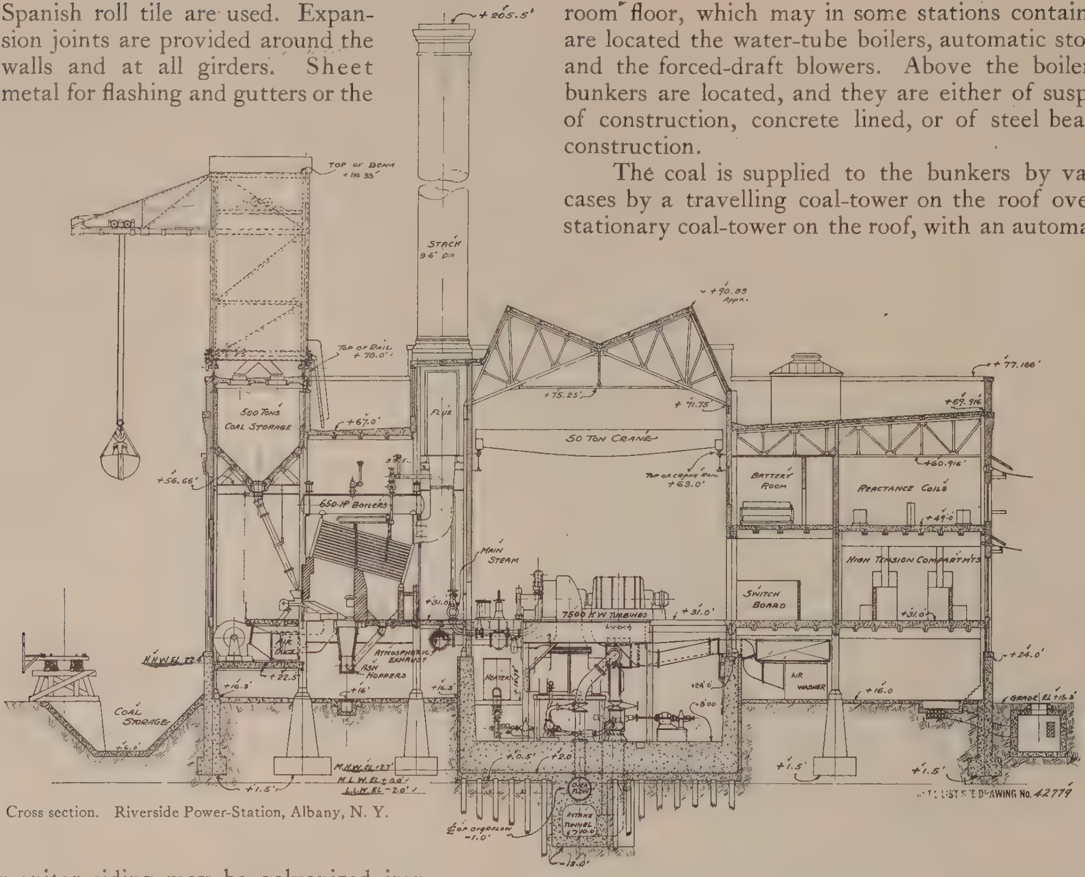
It is optional with the designer as to the many other architectural and construction details and the kind of materials used in connection with the building. This is also governed by the amount of money appropriated.

A brief description of the various materials or kind of finishes which are used are as follows:

Reinforced concrete floor and roof arches with granolithic, cement, or patent floor finishes. The underside of arches are usually finished with smooth finish by using dressed boards for centres. The use of plaster for ceiling finishes is not advisable.

Stairways are generally of cast-iron and wrought-iron construction with marble or slate treads for the electrical galleries and safety treads for boiler-house and elsewhere.

Roofing, five-ply asphalt felt and high melting asphalt finished with either slag or gravel, 6 by 9 inches flat vitrified tile, granolithic for flat surfaces and, if roofs are mansard, Spanish roll tile are used. Expansion joints are provided around the walls and at all girders. Sheet metal for flashing and gutters or the monitor siding may be galvanized iron, tuncan metal, or copper. Monitors may also be finished with T. C. block walls and stucco finish.



Cross section. Riverside Power-Station, Albany, N. Y.

The interior doors and trim may be of wood, but usually kalamein iron or copper and hollow steel are used. This also applies to the large and small door openings in the exterior walls. The large doors are generally built of wrought-iron frame and plates.

The walls of the building are usually constructed of common brick and are self-supporting.

The structural steel is of skeleton-steel design, especially designed to carry the enormous and unusual live loads of the various mechanical and electrical apparatus, in addition to the dead loads of the floor and roof construction.

The coal-handling towers and the high stacks, which run from 300 to 350 feet high, are also features which are mechanically essential, but are incongruous as to the design.

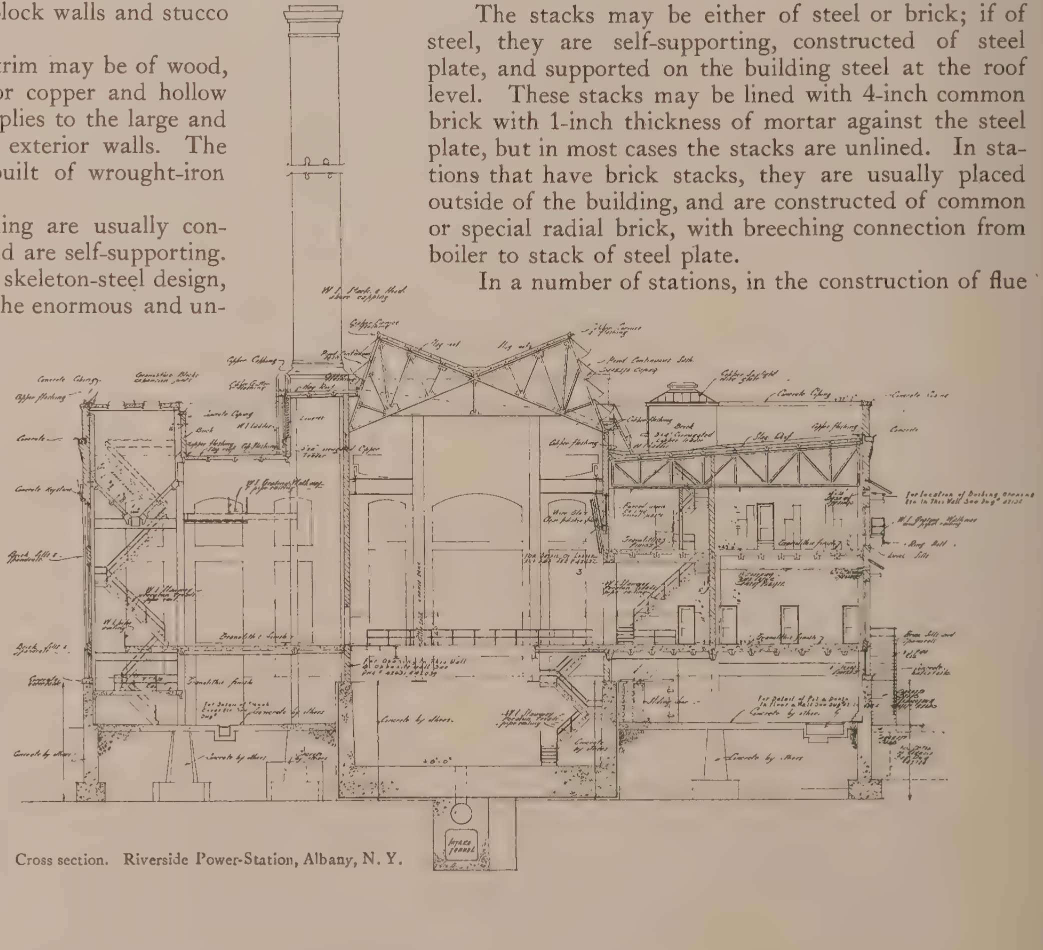
The boiler-house generally contains, in the basement, the ash-handling tracks and cars and the ash-hoppers under the boilers. In the boiler-room floor, which may in some stations contain two floors of boilers, are located the water-tube boilers, automatic stokers underneath same, and the forced-draft blowers. Above the boiler-room floor the coal-bunkers are located, and they are either of suspended steel-plate type of construction, concrete lined, or of steel beams and concrete-arch construction.

The coal is supplied to the bunkers by various means, in some cases by a travelling coal-tower on the roof over the bunker, or by a stationary coal-tower on the roof, with an automatic railway for distributing the coal to the bunkers, or by coal-towers located some distance from the building proper, and conveyed to the bunkers by means of travelling-bucket or belt-conveyers.

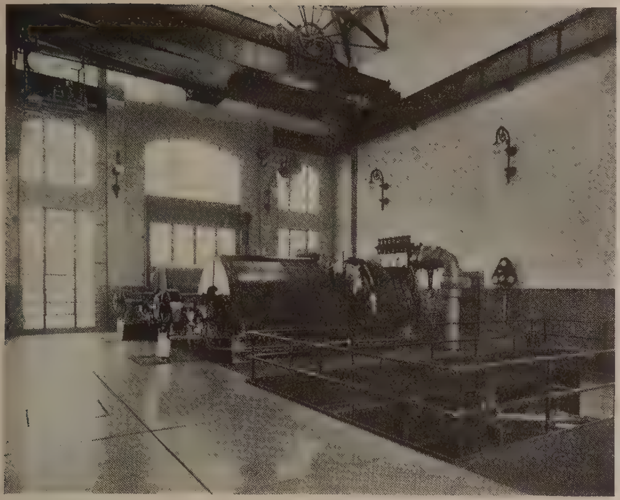
Monitors are placed over the coal-bunkers to provide light and ventilation, and it is important that means of egress from the bunkers be provided, as there is a danger of spontaneous combustion in the large amount of coal stored in the bunkers.

The stacks may be either of steel or brick; if of steel, they are self-supporting, constructed of steel plate, and supported on the building steel at the roof level. These stacks may be lined with 4-inch common brick with 1-inch thickness of mortar against the steel plate, but in most cases the stacks are unlined. In stations that have brick stacks, they are usually placed outside of the building, and are constructed of common or special radial brick, with breeching connection from boiler to stack of steel plate.

In a number of stations, in the construction of flue



Cross section. Riverside Power-Station, Albany, N. Y.



Interior of operating-room. Riverside Power-Station, Albany, N. Y.

from the boilers a smoke-consumer and dust-and-cinder catcher are installed, whereby any possible chance of complaints from people in the vicinity of the stations is avoided.

The operating or turbine room contains in the basement the air-washers, surface-condensers, circulating-pumps, air-pumps, condensate-pumps, open-feed water-heaters, boiler-feed pumps, house-service pumps, emergency sump-pumps, air-compressor, oil-filters, and tanks.

Underneath the basement floor of the operating-room the large intake and discharge tunnels are located, with the source of inlet and outlet from and to the river located at some distance apart. All the water brought into the station is passed through a series of screens which are housed in a small screen well-house, located near the source of inlet. These screens are arranged to raise for cleaning purposes.

In localities where there is danger from the river water rising to unusual heights at flood seasons, the basement walls of the operating-room are constructed of water-proofed reinforced concrete without any openings, which is carried up to a point above the high-record flood-water level. This insures against any possible chance of a shut-down or water damage, and maintains continuous service, which is essential, especially in public-service utility power-stations.

The operating-room is of clear-story height from the floor to the underside of the roof arches, and contains the turbo-generators and exciters.

The turbo-generator foundations are of structural steel, which is carried down to the basement floor; this permits using the space underneath for the auxiliary apparatus located in the basement.

One or two electric travelling cranes are installed above the floor with a clear span between the walls of the operating-room. The capacity of the cranes vary with the size of the largest part of the turbo-generators installed, and in large stations they have a lifting capacity of 100 tons.

The roof over the operating-room is usually provided with a large monitor or skylight, supplying light and ventilation for the operating-room.

The monitor sash are arranged in individual sash or continuous sash operated with special operating device for controlling these openings. The control for the operating device, which is either by hand or mechanical, is located near the operating-room floor, it being essential to quickly close these windows in case of a storm, thereby preventing any water damage to the electrical apparatus below.

The interior walls of the operating-room are sometimes treated architecturally with a panelled wall treatment, using glazed terra-cotta, faience tile, enamelled or salt-glazed brick for the wainscot, and enamelled, salt-glazed or Kittanning buff brick with terra-cotta or brick trim in different shades for the wall surfaces above. With this treatment it presents an interesting and pleasing interior, it assists in the distribution of light, and the walls can be easily cleaned. Where this treatment is not used it is usual to run a wainscot of glazed or enamelled brick which prevents the operators from soiling the walls, and the upper portion of the walls are of common brick painted with Rice's Mill White paint.

The turbo-generators are ventilated or cooled by means of fresh air brought in by ducts from the outside, the air is then cleaned and cooled by the air-washers, after which it goes through the turbo-generators, and from same by means of ducts and exhaust passage to outer air. It is desirable to discharge this air outdoors in the summer-time in order to obviate extreme high temperatures in the station, which affect the comfort of the employees. In the winter-time the warm exhaust air is discharged through a by-pass into the operating-room. This warm air serves to heat the operating-room, and is drawn into the boiler-house through openings in the division wall between the boiler-room and the operating-room by means of blowers. The blowers force the warm air into the automatic stoker underneath the boilers, thereby increasing the efficiency of the boilers. It is very difficult to maintain a boiler-room at a comfortable temperature in cold weather, and in some cases the temperature has been so low that the water-lines have been frozen. In order to burn coal it is necessary to furnish large quantities of air to the automatic stokers, and this quantity of air is so great in a large modern plant that the question of heating the boiler-house is a very important and serious one. An advantage of the above arrangement is that the heat from the turbo-generators is used in the winter for heating the turbine and boiler rooms. It is the general impression that a boiler-room would be excessively warm in the summer-time and comfortable in the winter; however, this is not the case, as the boiler-room is generally the coolest place, due to the circulation of the enormous volumes of air required for the boilers.

To give an idea of the tremendous quantity of air used for the combustion of coal, it figures about 300 to 400 cubic feet per hour per kilowatt so that in a station of 100,000

Central switchboard. Riverside Power-Station, Albany, N. Y.

Calumet power-plant, Chicago and Northwestern Railway, Chicago. Westinghouse-Church-Kerr Co., Inc., Architects.

kilowatt capacity the volume figures between 30 and 40 million cubic feet per hour.

The electrical galleries are usually the height of the operating-room with various floors or mezzanines containing the electrical apparatus, including control boards, switches, circuit-breakers, busses, and other electrical equipment necessary in such stations.

The main control board is usually located in a room on one of the upper floors, and is provided with an ornamental bay so arranged that the operator can see any point of the operating-room.

Wind-bracers are provided at end walls of operating-room to brace the long, unsupported columns and walls, also in some cases walk-ways are provided on these wind-braces to afford passage between the electrical galleries and upper part of boiler-house. These walk-ways are covered with ornamental front rail with clock and signal device worked in design, and with panelled wrought-iron soffit.

The walls of electrical galleries are usually of buff brick, and the electrical compartments are built of concrete or face brick.

Great care is taken in the station lighting to provide an arrangement to meet any emergency condition. A storage-battery is installed with automatic switches to provide lighting in essential circuits in case of interruption of the main supply.

Another advantage of a well-lighted station is that the operators work to better advantage, and there is less danger in working around the high-tension apparatus.

It is usual to provide a specially treated entrance-hall and lobby to receive visitors and a separate entrance for the employees with a timekeeper's office. Offices for the chief engineer and staff are also provided according to the station requirements.

Stairways are not required in the same proportion as other industrial buildings, owing to the small number of employees on duty at one time. The number, of course, installed must meet with the modified requirements and the approval of the respective building departments having jurisdiction.

In large stations an elevator is installed in the electrical galleries, and sometimes in the boiler-house, to permit the operators getting to the various points quickly.

Ample toilet and locker room accommodations are provided for the chief engineer and staff and for the operating employees.

The toilet and locker rooms are finished with tile floors, tile or enamelled brick walls, and plastered ceilings. The toilet-rooms are furnished with procelain or vitreous ware water-closets, urinals, wash-basins, slop-sinks, and shower-baths. The wash-basins, also slop-sinks and shower-baths, are supplied with hot and cold water.

The compartment partitions for the water-closets, urinals, and showers are generally of Tennessee marble. In some cases a marble wainscot is carried around the walls up to the height of the compartment partitions, and the walls are tiled above same up to the level of the ceiling.

The locker-rooms are provided with metal sectional lockers placed around the walls and in rows as required. The lockers have sloping tops and rest on raised platforms about 6 inches above the floor, and faced with enamelled brick or tile, forming sanitary base.

The toilet and locker rooms are placed where possible in a location affording outside light and ventilation, and it has been found by experience that the employees not only appreciate the light and sanitary accommodations that are given them, but maintain and keep same in a clean and orderly condition.

In the large stations a drinking-water system is in-

Hawaiian Electric Co., Ltd., Honolulu. Westinghouse-Church-Kerr Co., Inc., Architects.

stalled with porcelain sanitary bubbling drinking wall fountains placed at convenient locations throughout the building.

A fire stand-pipe system is usually installed with the main run in the basement and risers placed at convenient locations in the stair wells.

It is practically impossible to regulate the temperature of the turbine and boiler rooms in modern large power-stations, owing to conditions which arise in the operation of these plants. These conditions are due to the variable demand upon the stations as to the capacity required and the number of turbines and boilers in operation.

The offices, toilet, and locker rooms must be heated to a comfortable temperature.

In the general station design and construction the question of safety for the operating employees is a very serious one, and special consideration and study is given this question throughout the construction of the building and the mechanical and electrical apparatus.

The Emergency Fleet Corporation Project for the Bayles Shipyard, Inc., at Port Jefferson, Long Island

By Alfred C. Bossom

THE housing development for the Bayles Shipyard, Inc., which has been undertaken by the Emergency Fleet Corporation at Port Jefferson, Long Island, is located in one of the nicer residential sections around New York, and in consequence had to be made comparable with the adjoining property, as the individual houses are intended to be of use after the war.

The entire project divides itself into two sections, the one for temporary and the other for permanent housing. The temporary work comprises a group of dormitories with the attendant living accommodations, and the permanent work is made up of individual one-family cottages.

The ground selected upon which to make this development is midway between the Port Jefferson railroad-station and the shipyard, a few hundred feet back from the main street of the town, and in the form of an amphitheatre, with a pond at the lowest point and hills all around. Advantage was taken of the rather interesting contour of the land in developing the dormitory group by arranging the units in a radial form leading up to the main dining and lounging room block, and all overlooking the playing-field, which has been provided in the centre of the development. Each of these dormitories contains fifty cubicals, and is built forming each pair with complete lavatory accommodations in a separate building. An open arcade connects the front end of each of the units so that the men can walk to and from the dining-room and recreation-room to their bedroom without passing outdoors. This porch, or arcade, is ten feet wide, screened in summer and glazed in winter so that it will form a really practical sitting-room for the workers. In the group forming the living accommodations, which is distinct, there are a large recreation-room with the living-room above, a commodious dining-room laid out for cafeteria service, and kitchen equipment with sleeping-rooms for the kitchen help above, complete in all details. By taking advantage of the form as here indicated the men can sit upon the open porches in front of their houses, or in the living-room, and watch the sports taking place in front of them.

The general materials for these groups are stucco on the outside with composition roofs, and the inside will be finished with composition boards. The general foundations consist of wooden posts resting on pads of concrete. The permanent portion of the development, consisting of the individual houses, has been carried out in a character similar to the old Long Island fishing villages with the long shingles and low eaves, in many cases so typical of this section of America. No two houses are exactly alike either in exterior appearance or interior arrangement, although the variations are not enough to cause difficulty in building, but are sufficient to give that interest that alone can be obtained by this means. These houses will have roofs of composition material and will be plastered and finished on the inside as complete living units, and plenty of ground has been laid out for each of these. Everything tending to either cause or give the appearance of crowding has been studiously avoided.

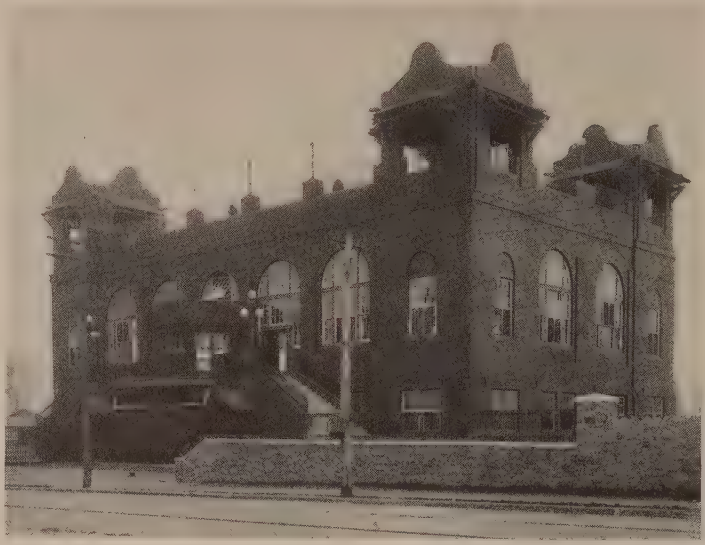
Preliminary study, country cottage. Bernhardt E. Muller, Architect.

The Recreation Building of the Viscose Company, Marcus Hook, Pa.

By William E. Groben

THE value of welfare work in industrial plants—indeed, in nearly every large business concern in the country—has long ceased to be a matter for discussion.

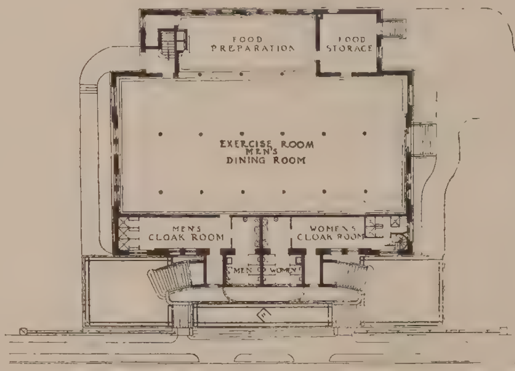
Wholesome working conditions have become almost everywhere a matter of course, and they are looked upon as the best of good business investments. Ways for providing recreation and amusement, comfortable rest-rooms, dispensaries and hospital accommodations for emergency cases are an integral part of every progressive and up-to-date factory and department store. Many concerns employing hundreds of work-people have found in this welfare service the best possible solution of the difficult problem of keeping their workers contented.


Recreation building, American Viscose Co., Marcus Hook, Pa.

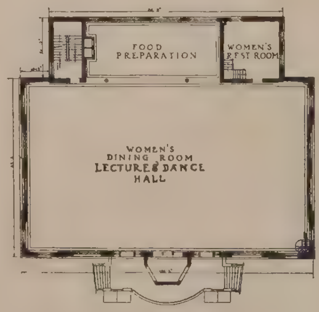
Upon the completion of the buildings for the Viscose Company, manufacturers of artificial silk, at Marcus Hook, Pa., for which Ballinger & Perrot were the architects and engineers, a modern industrial village was erected to house their operatives as the result of insufficient housing facilities within reasonable distance of the plant.

This development, located on the Philadelphia and Wilmington Post Road, the main highway between Chester, Pa., and Wilmington, Del., is interesting because it is a pre-war village, and especially so because this company had the wisdom to seek expert advice at the very inception of their housing project.

This attitude marked an advance in the solution of the industrial problem. It was realized that improved housing was just as essential as modern working facilities within the plant itself, and that the best way to secure and retain contented and efficient workers was to provide modern homes for them and, moreover, to make their home life attractive.



GROUND FLOOR PLAN

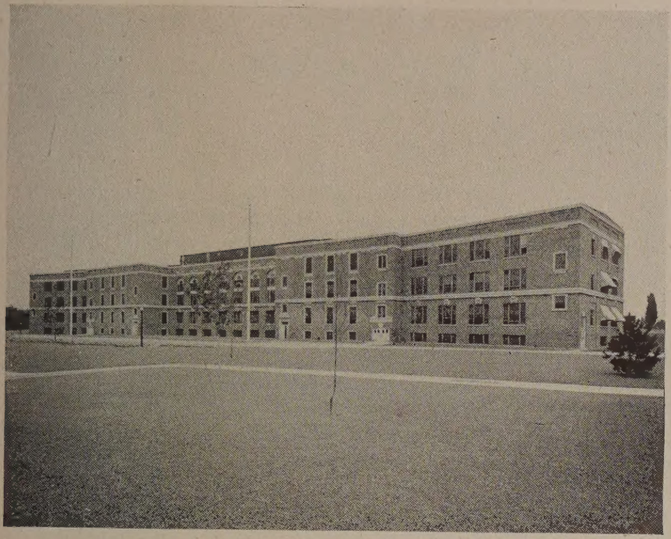


FIRST FLOOR PLAN

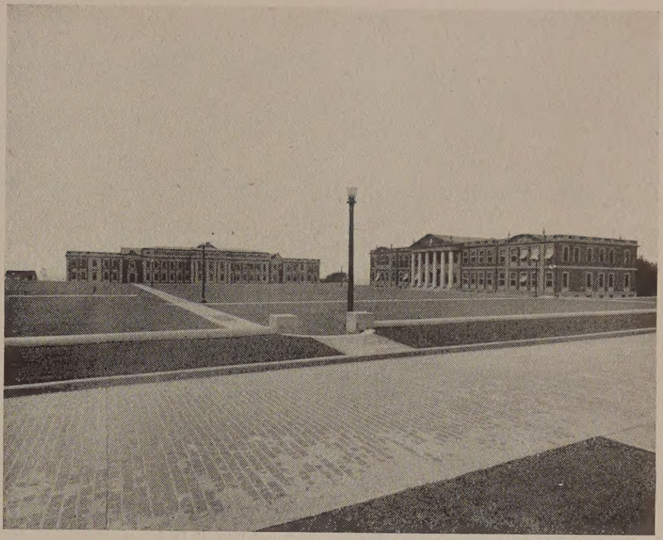
What was of equal importance was the provision made for the amusement and recreation of the employees and their families by the erection of a communal building in which the community sense of "neighborliness" could be cultivated. It was felt that the financial expenditure required to foster this spirit of fellowship was not useless or wasteful, but a highly essential and necessary one for the well-being and contentment of their operatives, particularly for those who, with their families, had been brought from a distance. On the main floor of this building there is a large room for such recreational features as public entertainments, lectures, and dances, with kitchen service adjacent to furnish refreshments for these occasions. During the day this large room is utilized as a dining-room and cafeteria in connection with the industrial plant. In addition there are rest-rooms and a sewing-room. The basement, which is above grade, not only contains facilities for service, such as food preparation and storage, but also a large dining-room for men, having locker and toilet accommodations adjacent so that it may be used as an exercise-room. A roof-garden, floored with promenade tile, has been provided. Contemplated in the programme of this building is the future enclosing of this roof-garden, to make it a modern and completely equipped gymnasium.

It was not deemed necessary to include a swimming-pool within the building proper, because the use of the plant reservoir, 120 feet by 160 feet, and 8 feet deep, for the storage of process water, has been permitted for this purpose. This reservoir has a diving-board, etc., and is provided with hand-ropes around all sides, which come within several inches of the surface of the water. The male employees have the swimming privileges during the week, except on Saturday, when the depth of water is reduced to 4 feet for the benefit of the women and girls.

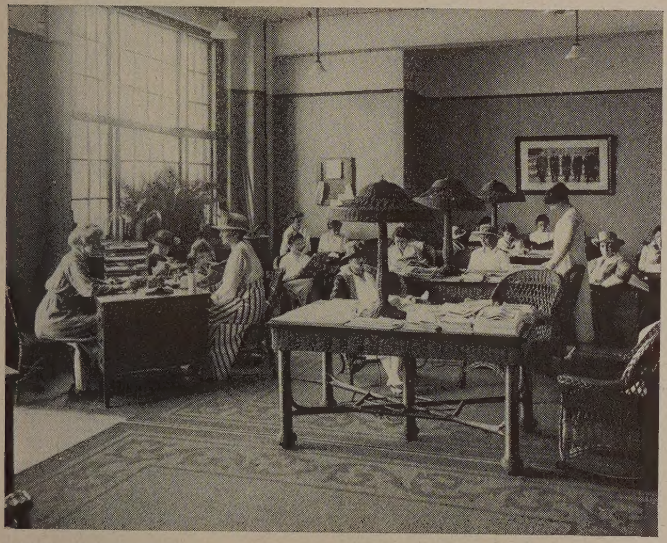
These features, as well as a dispensary having several nurses always in attendance, are evidences of the ever-increasing recognition, among manufacturers, of the moral and economic importance of creating around industry the most favorable conditions for the work, rest, and recreation of their employees.



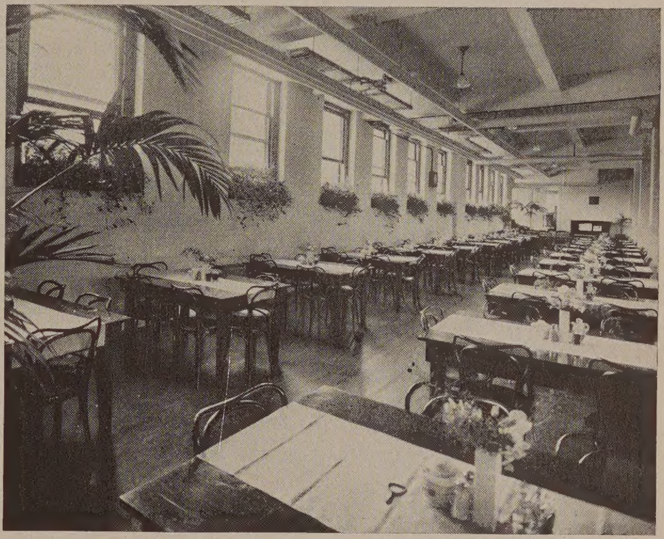
Lamp laboratory, modern factory building.



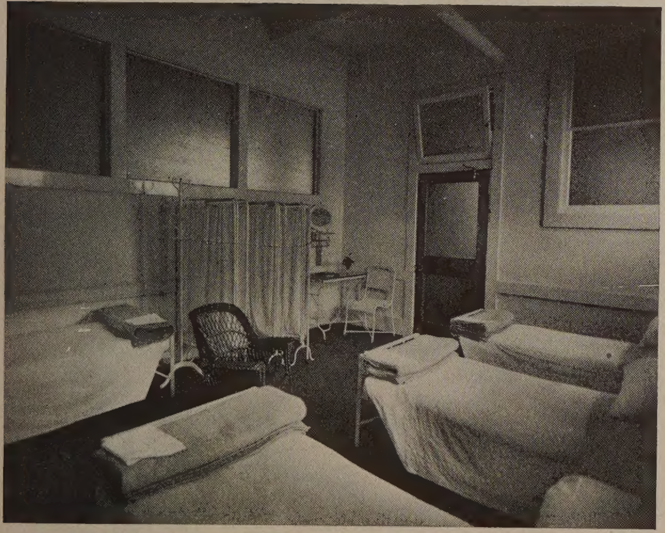
View across park showing engineering and sales buildings.



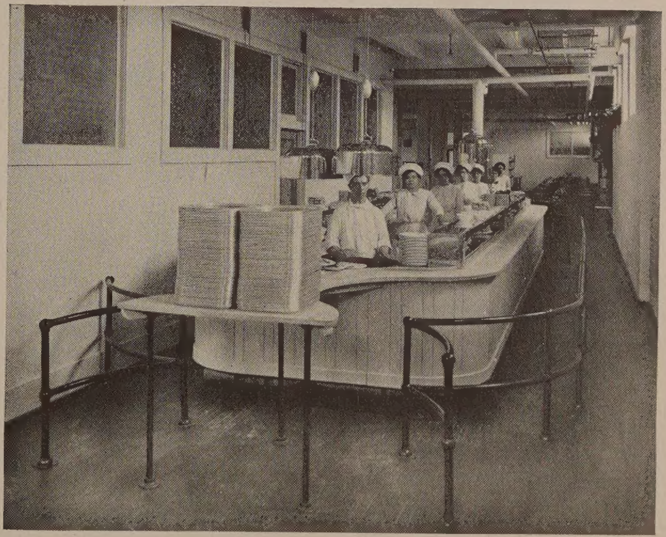
Library and service-room.



Dining-room.



A corner of the dispensary service department.



Cafeteria.

SERVICE DEPARTMENT, NATIONAL LAMP WORKS, NELA PARK, CLEVELAND, OHIO.

Wallis and Goodwillie, Architects.

Fire Prevention in Factories and Warehouses

By Howard Chapman

FIRE prevention in factories and warehouses can be viewed from various angles.

The most usual point of view is the reduction in cost of insurance. This is the greatest incentive toward preventing fires. The saving in dollars can be figured and makes more owners sit up and take notice than anything else.

Insurance companies are in business primarily to pay dividends to the stockholders; nevertheless, they have done more toward fire prevention than any other group of people.

But the saving in cost of insurance should not, by any means, be the only consideration. What is burned is lost forever. In time of peace most material and labor can be replaced by other material and more labor, although not always. In war times much material cannot be replaced at all, or at least in time to be of service. This has been a real and very important consideration, especially to the government, when the market value of munitions or material for making munitions could not be calculated and dollars were not a primary consideration.

Fire protection from this point of view has not usually received the attention that it should.

The next point of view, which, unfortunately, has not received sufficient consideration, especially with small, growing concerns, is the loss of business and inconvenience suffered by a fire. Insurance may cover the greater amount of the market value of stock and buildings, but it does not prevent or reimburse for any interruption of business, which might be very serious and lasting in time of peace and vital to us all in time of war.

Use and occupancy insurance is designed to cover this feature in part, but the contingent losses cannot be measured with sufficient accuracy in advance to secure full reimbursement.

Taking precautions against fires to reduce the hazard to others has not received as much attention in this country as abroad. It is now receiving attention here, and some cities have recently enacted laws imposing penalties for the occurrence of fires due to carelessness and neglect. We have been too prone to consider a fire as a public misfortune rather than considering the individual liability. Where laws have been passed and enforced, it has done much to reduce fires and make the individual realize that he owes something to his neighbors, and that he can, on the other hand, insist upon his neighbors using proper precautions against our national fault of carelessness and neglect.

Fire prevention viewed as safety to life has indirectly been helped by insurance on property, although requirements insisted upon by underwriters do not take into consideration the protection to life. We cannot always look to the conscience of owners, but must depend upon laws and their enforcement, backed by public sentiment.

Public sentiment, however, is erratic. It goes to sleep when all is well and becomes hysterical when a fatal catastrophe occurs.

The details of construction and equipment tending to prevent fires are so fully given in pamphlets issued by fire-protection associations and underwriting companies, and in building laws, that they seem out of place here, although they may be mentioned in a broad way.

Non-combustible buildings are superseding other types. Their cost, aside from the consideration of permanency, is no more or little more than that of inflammable buildings, and in some cases cheaper. They will be probably cheaper after the war, with the steel industry keyed up to the point where it will be, and with the growing scarcity of lumber, especially heavy timber.

The study of occupancy has helped in protection by the segregation of hazards and arranging processes to minimize the chance of fire starting and reduce the exposure of large values in a single fire area.

Of all fire-fighting equipment, a complete system of automatic sprinklers is undoubtedly the most effective, as demonstrated by thousands of fires and long experience. It normally handles the fire in its incipiency and prevents it from becoming a fire of conflagration proportions.

The sprinkler system, as well as being a protection to property, has the further and very important province of safeguarding human life, for instances of a loss of life in a building where a sprinkler system was in operating condition have been so few as to be practically negligible.

It eliminates dependency on the human element, except in so far as involved in its maintenance, in which the element of panic does not exist.

The moral element as a hazard is also reduced by a sprinkler system, as no fire of great proportion can be wilfully developed without tampering with the protective equipment and leaving incriminating evidence after the fire.

Conservation is of more importance now than ever before in the world's history, and yet this country prepared herself last year for entry into the great struggle by a fire loss per capita greater than any year since 1875, except the year of the San Francisco conflagration.

For the sake of patriotism, as well as for the saving of this cost to us all, let us do all that we can to minimize this great wastage and urge others to help in this national duty.

Some of the Bits Your Liberty Bond Will Do

IF you buy a $100 bond of the Fourth Liberty Loan you are lending the United States Government enough money to feed a soldier in France a little more than seven months. Or you have furnished enough money to give him a complete outfit of winter and summer clothing, including shoes and stockings and slicker and overcoat and blankets, with enough left over to arm him with a good revolver.

You have done that much to beat back the Hun.

It takes $35 more to arm him with a rifle with a bayonet on it, and if you buy a second $100 bond you furnish him this rifle and 1,000 cartridges for it; and there will still be enough of your money left to purchase a good-sized bomb to throw in a dugout or demolish a machine gun together with the Huns operating it.

Electric Installation for the Household

By Theodore Dwight

Of the Society for Electrical Development

WHEN Phillips Brooks protested to Richardson that in planning the Trinity Church rectory he had not provided enough windows in his study, the reply was: "You cannot expect me to spoil *my* building for *your* study."

The conflict between æstheticism and utilitarianism continues even to this day, although the ever-increasing public understanding of Ruskin's purpose in defining utility as the touchstone, so to speak, of artistic appraisal is doing much to harmonize the aims of those who build houses and those who live in them. And it is notably true that the most nearly perfect agreement is with regard to the application of electricity for light, heat, and power. The reason is not hard to find. In no branch of construction and building operations has there been greater effective harmonizing of "art" and "utility" than is to be observed in the electrical structural material and media of to-day.

The unsightly exposed wiring and drop cords of yesterday have given place to concealed wiring in conduits between walls and floors. Artistically designed push-buttons, toggle-switches, and small receptacles are the order of the day; the clumsy snap-switch of a few years ago is almost archaic. Remote control and three-way switches also have contributed their quota of comfort and convenience. And as a means of lightening household drudgery, promoting economy, and facilitating greater utility, electricity has come to play a part of ever-increasing importance, to say nothing of the safety and improved sanitation that its use assures and makes possible.

The Department of Commerce, Bureau of Standards, in its comprehensive circular No. 75, "Safety for the Household," octavo, 125 pages, price 15 cents, has published a work that should be in the reference library of every architect. The following quotation is from the introduction of Chapter II:

"Electricity is one of the most conveniently applied forms of energy for household processes and activities. It is used not only to illuminate the home but to supply power to various small motor-driven apparatus and to supply heat to cooking appliances and other small heating devices. In addition to the great convenience and adaptability of electricity for such purposes, it has the further important advantage, when properly used, of increased safety over many of its predecessors and competitors for rendering like service, such as candles, oil-lamps, acetylene and gasolene for lighting, gasolene for power and coal, oil or gasolene stoves for cooking and heating. It does away with the use of matches and the use within buildings of substances such as coal, oil, and gasolene, which of themselves impose a greater or less fire hazard whenever stored within the building.

"Notwithstanding all this, there are serious possible hazards to both life and property from electric wiring and devices if wrongly installed or mishandled. These will be here considered, so that the careful householder may realize the maximum degree of safety in his electrical installations which the development of modern methods of wiring and modern designs of appliances make available to him."

As is shown in the careful study of the subject, both the safety and the convenience of electricity depend largely on the architect.

In industrial plants, electricity is the recognized standard for illumination and power drive—why not in the home?

The architect invariably urges his client to have only the most modern plumbing for the sake of health *alone*. Why should he not be liberal in planning the electrical installation which affects not only health, eyesight, and comfort, but the fire hazard as well!

It is regrettable but nevertheless true that architects are all too prone, because of the old central-station practice of rating outlets for lights on a basis of 16-candle-power carbon lamps (consuming 50 to 60 watts), or 10 lamps to a branch circuit. With the advent of the more efficient Mazda lamp (tungsten) it is common practice to use 40 or 25 watt lamps, the latter giving more illumination than the old 50-watt carbon. Hence the only proper way is to speak of watt-hour consumption, as electricity is sold on the basis of watt-hour or generally kilowatt-hours (1,000 watt-hours), *i. e.*, 1,000 watts for one hour or 100 watts for ten hours.

Why does the architect not provide convenience outlets to permit the free use of appliances? The answer is because he believes their use will be costly in operation. Let us see what the average use of various devices amounts to per month—at 10 cents per kilowatt-hour. (Kw.-Hr.)

	KW.-HRS.	CENTS PER MONTH
Washing-machines....................	1⅔	16⅔
Vacuum-cleaners (portable)..........	2 1/10	21
Percolators.........................	3½	35
Irons...............................	5½	55
Toasters............................	3 1/10	31
Bell-ringing transformers...........	negligible	
Vibrators...........................	negligible	
Curling-iron heaters................	....	⅔ c. an hour
Heating-pads........................	....	½ c. " "
Small fans..........................	....	$3 a year's use

The above figures are averaged from many returns of appliances in actual use. Certainly these figures furnish no excuse for avoiding their use.

In planning the specifications for the electric service, the architect should first consult the local central station as to terms and character of service; and as hearty co-operation is always assured, no further reference need be made here to the wiring up to the service metre.

Interior Wire Installation. The best-observed practice in building is to conceal the wire between walls and floors in rigid or flexible conduit. For finished buildings flexible armored cable is often more convenient to install.

The next step is to get in touch with a reliable electrical contractor—he will be familiar with both the local ordinances and the latest requirements of the electrical code of the National Board of Fire Underwriters.

With these matters taken care of the laying out of the wiring plans and the location and character of outlets then can be determined. Adequate provision for present needs and possible future requirements is the essential factor. Lighting circuits and those for heating, cooking, and power appliances should be independent, as the code does not permit more than 660 watts to be distributed on any one branch circuit used for lighting (except by special permission). Furthermore, many central stations grant a lower rate for ranges and heating appliances if connected to a separate metre.

The electrical code prescribes the conditions of safe wiring, but it is important to have its provisions carried out by a thoroughly responsible contractor, and much valuable assistance can be rendered by such a contractor in laying out the plans. It should always be remembered in using the code that it prescribes merely the *minimum* requirements allowable to secure insurance and generally to insure its passing the city inspector, but for greater safety and convenience it is wise to provide a wider margin. Convenience outlets then can be added at a trifling cost, when building. They will cost much more in time and money if added later.

While the applications of electricity to the home are constantly increasing, it will, perhaps, be interesting to mention some of the present-day uses and to suggest ways of making them readily available.

In General. The same convenience outlets can be used for irons, vacuum-cleaners, percolators, toasters, teakettles, samovars, grills, floor-polishers, and many other appliances.

A majority of the relatively few fires caused by electricity in the home occur through changes and extensions to existing wiring by inexperienced persons.

Additional outlets may occasionally overload the circuit requiring larger fuses than are safe, but the architect can greatly minimize this danger by installing adequate wiring and outlets when the house is built or altered. And in that connection a list of the electrical appliances now being used and sold for use in the home will furnish valuable guidance and may, perhaps, prove illuminating.

General House Use

Lighting.
Vacuum-cleaner.
Fan motor, watts, 20–100.
Bell-ringing transformer, negligible.

Cellar Workshop

Grinder.
Glue-pot, watts, 200–500.
Soldering-iron, watts, 100–200.
Breast drill.
Small motor for operating tools.
Portable for cleaning heater

Laundry

Washing-machine, watts, 300.
Irons, watts, 600.
Laundry machine.

Garage

Fire pumps.
Portable drill.
Grinding-machine.
Buffing-machine.
Charging-batteries.

Kitchen

Electric stoves, special circuit.
Electric teakettle, watts, 400–500.
Disc stoves, watts, 200–660.
Frying-pans, watts, 550–660.
Radiant grill, watts, 500–600.
Toaster, watts, 400–600.
Coffee-grinder.
Meat-chopper.
Bread-mixer.
Egg-beater.
Silver-polisher.
Knife-grinder.

Dining-Room

Chafing-dish, watts, 400–600.
Coffee-percolator, watts, 300–500.
Cigar-lighter, watts, 25.
Hot-water heater, watts, 150–1,000.
Luminous radiator, watts, 250–500.
Samovar, watts, 400–500.

Sitting-Room or Library

Table or desk lamp.
Sewing-machine, small wattage.

Parlor or Reception-Room

Outlets.
Table lamps.
Electric piano.
Electric talking-machine.

Halls

Turn-down lamp.

Bedroom or Boudoir

Curling-iron, watts, 15–25.
Bed pad, watts, 50–100.
Reading-lamp at head of bed.
Ozonator for sickness, watts, 10–20.
Hair-dryer, watts, 50–75.
Massage vibrator, small wattage.

Nursery

Baby milk-warmer, watts, 300–500.

Bathroom

Shaving-mug, watts, 150–1,000.

Many Conduit Specifications Read:

"SHERARDUCT or Equal"

When these Specifications are lived up to "SHERARDUCT" is always installed.

National Metal Molding Co
Manufacturers of
Electrical Conduits & Fittings
1123 Fulton Building, PITTSBURGH, PA.

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